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INDEX, VOLUME XIII., 1916.

PAGE

Acknowledgment, an (Editorial) 619
Additional Fertiliser Experiments, Gwebi, by A. G. Holborow, F.I.C. 511
Advertisements (Editorial) 186
Agricultural Journal Index (Editorial) 783
Agricultural Outlook 112, 263, 399, 545, 710, 848
Analyses, Chemical. See "Departmental Notices."
Annual Report of the Director of Agriculture, 1915 330
Arsenical Dips, Preservative for Samples, by A. G. Holborow, F.I.C. 816
Arsenite of Soda, Supply of (Editorial) 178
Artificial Fertilisers and the War, by A. G. Holborow, F.I.C. 381
Association Meetings, Farmers' (Editorial) 343
Associations, Farmers'. Dates of Meetings. See "Farmers' Associations."
Authors. See List.

Bacon Factory 214
,, ,, by F. Eyles, F.L.S. 374
,, ,, Breeding and Feeding Pigs for, by R. C. Simmons 187
Beef Feeding Experiments (Editorial) 2
,, ,, No. 1, by R. C. Simmons 10
,, ,, No. 2, by R. C. Simmons 620
,, ,, No. 2 (Correspondence) 845
Bee Keeping, Notes on, by F. Sworder 92, 831
,, See "Farming Calendar."
Breeding and Feeding of Pigs (Editorial) 461
,, of Pigs for Bacon Factory Purposes, by R. C. Simmons 187
Bulletins, Departmental 144, 293, 427, 580, 748, 885
Burning of Grass (Editorial) 325

Calendar, Farming 116, 269, 403, 550, 717, 853
Carob Bean (Ceratonia siliqua) (Correspondence) 709
Cattle, Dehorning of, by W. S. Wood 252
,, Dipping Tanks, Construction of 523
,, Export to the Union (Editorial) 781
,, Slaughter, to the Rand (Editorial) 182
Cement Concrete, Hints on, by W. M. Watt 518
,, in Relation to Dip Tanks (Editorial) 463

PAGE

Ceratonia siliqua (Carob Bean) (Correspondence) 709
Charges for Chemical Analyses. See "Departmental Notices."
,, Dipping Cattle. See "Departmental Notices."
,, Services of Veterinary Surgeons. See "Departmental Notices."
,, Trees. See "Departmental Notices."
Chemical Analyses. See "Departmental Notices."
Chief Veterinary Surgeon's Report (1915) 344
Citrus Budwood (Correspondence) 108
,, Culture. See "Departmental Notices."
,, Export (Correspondence) 109
,, Fruit, Export of, by A. G. Turner 84
,, ,, at the 1916 Shows, by A. G. Turner 699
,, ,, See "Farming Calendar."
,, Oranges for the Troops Fund 254
,, Pests, by R. W. Jack, F.E.S. 69, 215
Clouds, Classification of, by R. H. Scott, M.A., F.R.S. 103
Compulsory Dipping, by E. A. Nobbs, Ph.D., B.Sc., and J. M. Sinclair, M.R.C.V.S. 466
Compulsory Dipping Ordinance, Application of (Editorial) 616
Concrete, Cement, Hints on, by W. M. Watt 518
Congress, the Farmers' (Editorial) 175
Construction of Cattle Dipping Tanks, Revised 523
Co-operation in Matabeleland (Editorial) 457
Co-operative Experiments, by J. A. T. Walters, B.A. 822
Correction (Editorial) 186
Cows, Shedding for, on Rhodesian Farms, by R. C. Simmons 678
Crop Experiments at the Government Farm, Gwebi, 1915-16, by E. A. Nobbs, Ph.D., B.Sc. 474, 659
Crops. See "Farming Calendar."
,, Estimates of Maize and Tobacco, 1915-16, by E. A. Nobbs, Ph.D., B.Sc., and B. Haslewood, F.S.S. 248
,, New, for Rhodesia, by J. A. T. Walters, B.A. 626
,, Statistical Returns of, 1914-15, by E. A. Nobbs, Ph.D., B.Sc., and B. Haslewood, F.S.S. 28
,, Statistical Returns of, 1915-16, by E. A. Nobbs, Ph.D., B.Sc., and F. Eyles, F.L.S. 784
,, Unsuitable to Southern Rhodesian Conditions, by J. A. T. Walters, B.A. 378
Cultivators and Planters, Multiple Attachment for, by B. A. Bland 515
Cuttings, Notes on Propagation by means of, by F. B. Willoughby 388
Cutworms, Campaign against (Editorial) 8

Dates of Farmers' Associations' Meetings. See "Farmers' Associations."
Deciduous Trees. See "Farming Calendar."
Dehorning of Cattle, by W. S. Wood 252
Departmental Bulletins. See "Bulletins."
,, Notices 133, 285, 416, 563, 731, 868
Determination of Sex in Mammals, by H. E. Hornby, M.R.C.V.S. 63
Dhal, Uses of 706

PAGE

Dipping at Government Tanks, Charges. See "Departmental Notices."
,, Compulsory, by E. A. Nobbs, Ph.D., B.Sc., and J. M. Sinclair, M.R.C.V.S. ... 466
,, Material, Supply of (Editorial) ... 178
,, Ordinance, Compulsory, Application of (Editorial) ... 616
,, Tank (Correspondence) ... 107
,, ,, How to find capacity of ... 237
,, ,, Native owned (Editorial) ... 181
,, Tanks for Cattle, Construction of, Revised ... 523
Dips, Preservative for Arsenical, by A. G. Holborow, F.I.C. ... 816
Dip Tanks, Cement in Relation to (Editorial) ... 463
Director's Annual Report (1915) ... 330
Dogs, Destruction of Wild (Editorial) ... 329

Elephant Grass (Napier's Fodder), by J. A. T. Walters, B.A. 87
Employment on Farms 148, 297, 431, 584, 752, 889
Engineer, Services of Agricultural. See "Departmental Notices."
Entomological. See "Farming Calendar."
Entomology. See "Departmental Notices."
Estimates, Maize and Tobacco Crops, 1915-16, by E. A. Nobbs, Ph.D., B.Sc., and B. Haslewood, F.S.S. ... 248
Eucalypts suitable to Southern Rhodesia and how to grow them, by F. B. Willoughby ... 361
Evaporation, Cleveland Reservoir, July, 1915, to June, 1916 535
Experiments, Additional Fertiliser, Gwebi, by A. G. Holborow, F.I.C. 511
,, Beef Feeding, No. 1, by R. C. Simmons 10
,, ,, No. 2, by R. C. Simmons 620
,, ,, ,, (Correspondence) 845
,, Co-operative, by J. A. T. Walters, B.A. 822
,, Crop, at the Gwebi Farm, 1915-16, by E. A. Nobbs, Ph.D., B.Sc. ... 474, 659
,, Fattening (Editorial) ... 2
,, Potato Spraying (Editorial) ... 326
,, Records of (Editorial) ... 618
Export of Cattle to the Union (Editorial) ... 781
,, Citrus Fruit, by A. G. Turner ... 84
,, Napier's Fodder Roots to the Union (Editorial) 459
,, Pigs to the Union (Editorial) ... 460
,, Rhodesian Tobacco to Australia (Editorial) ... 458
,, ,, ,, Britain (Editorial) ... 459

Farm and Live Stock Statistics, 1915, by E. A. Nobbs, Ph.D., B.Sc., and B. Haslewood, F.S.S. ... 238
,, Pupils (Editorial) ... 328
Farmers' Associations, Meetings (Table) 132, 284, 415, 562, 730, 867
,, ,, ,, (Editorial) ... 343
,, Congress, the (Editorial) ... 175
Farming Calendar. See "Calendar."
Fattening Experiments (Editorial) ... 2, 461

PAGE

Feeding and Breeding of Pigs (Editorial) 461
,, Experiments, Beef, No. 1 10
,, ,, ,, No. 2 620
,, ,, ,, ,, (Correspondence) 845
,, of Pigs for Bacon Factory Purposes, by R. C. Simmons ... 187
,, Value of Maize Varieties 698
Fertiliser Experiments, Additional, Gwebi, by A. G. Holborow, F.I.C. 511
,, Maize Planting with, and the Advent of Rains, by A. G. Holborow, F.I.C. 652
,, Salisbury General (Editorial) 618
Fertilisers and the War (Editorial) 324
,, Artificial, and the War, by A. G. Holborow, F.I.C. 381
Flower Garden. See "Farming Calendar."
Fly Papers, Home-made, by R. W. Jack, F.E.S. 819
Fore Carriage for Planters and Cultivators, by B. A. Bland 515
Forest Nursery, the Government 98
Forestry. See "Farming Calendar."
,, Sale of Trees. See "Departmental Notices."

Government Notices 150, 299, 432, 585, 753, 890
Grading Maize, 1915, by J. A. T. Walters, B.A. 45
Granite Sand Soils, Maize Growing on, by G. S. Money 813
Grass Burning (Editorial) 325
Ground Nut, the (Correspondence) 392, 542
,, Nuts and other Oil Seeds. Oil Factory Announcement 673
,, ,, Value of and Market for 536
Gum Trees, Planting of (Editorial) 327
Gwebi Farm, Stud Stock on (Editorial) 182
,, ,, Reports of Crop Experiments, 1915-16, by E. A. Nobbs, Ph.D., B.Sc., Parts I. and II. 474, 659
,, ,, Additional Fertiliser Experiments, by A. G. Holborow, F.I.C. 511

Home-made Fly Papers, by R. W. Jack, F.E.S. 819
Horse-sickness, Inoculation against (Editorial) 781
Hygienic Production and Handling of Milk, by C. E. Hall 369

Immunity in relation to Stock Diseases of Southern Rhodesia, by L. E. W. Bevan, M.R.C.V.S. 640, 800
Imperial Institute, Work of the (Editorial) 615
Importation of Pedigree Shorthorns (Editorial) 4
Index to the *Agricultural Journal* (Editorial) 785
Industrial League, an (Editorial) 464
Inoculation against Horse-sickness (Editorial) 781
Irrigation. See "Departmental Notices."

Journal Appreciated (Editorial) 463

Labour Bureau Fees (Editorial) 5
Lectures for Farmers. See "Departmental Notices."

PAGE

Live Stock. See "Departmental Notices."
,, and Produce Prices, 1915 (Table) 368
,, Statistics, 1915, by E. A. Nobbs, Ph.D., B.Sc., and B. Haslewood, F.S.S. 238
Lowry, the Late Capt. H. C. (Editorial) 617

Maize Cob Fodder (Correspondence) 395
,, Crop, 1915-16, Estimates, by E. A. Nobbs, Ph.D., B.Sc., and B. Haslewood, F.S.S. 248
,, Grading, 1915, by J. A. T. Walters, B.A. 45
,, Growing on Granite Sand Soils, by G. S. Money 813
,, Manuring of, on Government Farm, Gwebi, by A. G. Holborow, F.I.C. 506
,, Pest, Witch Weed or Rooi Bloem, by J. A. T. Walters, B.A. 234
,, Planting with Fertiliser and the Advent of the Rains, by A. G. Holborow, F.I.C. 652
,, Topping of (Correspondence) 707
,, Varieties and Feeding Value 698
Manuring of Maize on Government Farm, Gwebi, by A. G. Holborow, F.I.C. 506
Marketing of Poultry Products, by F. Sheppard 384
Market Prices of Stock and Produce, 1915 (Table) 368
,, Reports 122, 274
Milk, Hygienic Production and Handling of, by C. E. Hall 369
Mitchell, Geo., M.L.C., Herd belonging to (Editorial) 182
Monkey Nut, the (Correspondence) 392, 542
,, Nuts and other Oil Seeds. Oil Factory Announcement 673
,, ,, Market for and Value of 536
Multiple Attachment for Planters and Cultivators, by B. A. Bland 515

Napier's Fodder (Elephant Grass), by J. A. T. Walters, B.A. 87
,, ,, Roots, Export to the Union (Editorial) 459
Nature Study (Editorial) 781
New Crops for Rhodesia, by J. A. T. Walters, B.A. 626
Notices, Government. See "Government Notices."
Nursery, Forest, the Government 98

Obituary. The late Capt. H. C. Lowry 617
,, ,, Mr. H. W. St. Quintin 91
,, ,, ,, J. M. White 329
,, ,, ,, E. Wilson 617
Oil Crops (Review) 390
,, Factory, Salisbury, by F. Eyles, F.L.S. 52
,, ,, ,, (Editorial) 184
,, Seeds and Ground Nuts. Oil Factory Announcement 673
Oranges for the Troops Fund 254
Outlook, Agricultural. See "Agricultural Outlook."

Pennisetum purpureum (Napier's Fodder), by J. A. T. Walters, B.A. 87
Permanganate of Potash for Stock Wounds (Correspondence) 539
Pest, a New Maize, Witch Weed or Rooi Bloem, by J. A. T. Walters, B.A. 234

PAGE

Pests, Citrus, by R. W. Jack, F.E.S. 69, 215
Pig Rearing, Expert Information re (Editorial) 460
Pigs, Breeding and Feeding of (Editorial) 461
,, ,, ,, for Bacon Factory Purposes, by R. C. Simmons 187
,, Export of to the Union (Editorial) 460
Pip in Poultry (Correspondence) 847
Planters and Cultivators, Multiple Attachment for, by B. A. Bland 515
Planting Maize with Fertiliser and the Advent of the Rains, by A G. Holborow, F.I.C. 652
Plants, Poisonous. See "Departmental Notices."
Ploughing Demonstration (Editorial) 782
Poisonous Plants. See "Departmental Notices."
Potash, a Source of, by J. M. Moubray, A.I.M.M. 101
,, Sources of (Editorial) 6
Potatoes, Does it Pay to Spray? by R. W. Jack, F.E.S. 354
Potato Growing (Editorial) 183
,, Spraying Experiments (Editorial) 326
Poultry at the Shows, 1916, by F. Sheppard 703
,, Diseases, Prevention of, by F. Sheppard 836
,, in Rhodesia, by F. Sheppard 52, 258
,, Pip in (Correspondence) 847
,, Products, Marketing of, by F. Sheppard 384
,, See "Farming Calendar."
Prevention of Poultry Diseases, by F. Sheppard 836
Prices of Stock and Produce, 1915 (Table) 368
Produce and Stock, Prices of, 1915 (Table) 368
Propagation by means of Cuttings in Rhodesia, by F. B. Willoughby 388
Pupils, Farm (Editorial) 328

Rand September Show, Proposed Rhodesian Exhibit 544
,, Show (Editorial) 782
Report of the Chief Veterinary Surgeon, 1915 344
,, ,, Director of Agriculture, 1915 330
Reports on Crop Experiments at the Government Farm, Gwebi, by E. A. Nobbs, Ph.D., B.Sc., 1915-16 ... ... 474, 659
Reviews 390, 537
R.N.L.B. Fees (Editorial) 5
Rooi Bloem, a New Maize Pest, by J. A. T. Walters, B.A. 234

Sale of Shrubs. See "Departmental Notices."
,, Trees. See "Departmental Notices."
Salisbury Show, 1916 690
Salt 619
Samples for Enquiry and Identification. See "Departmental Notices."
Seed, Disposal of Pure. See "Departmental Notices."
Seeds, Farm. See "Departmental Notices."
Sex, Determination of, in Mammals, by H. E. Hornby, M.R.C.V.S. 65
Shedding for Milch Cows on Rhodesian Farms, by R. C. Simmons 678
Shorthorns, Importation of Pedigree (Editorial) 4

PAGE

Shows, Agricultural ... 489
,, Citrus Fruit at, 1916, by A. G. Turner ... 699
,, Dates ... 353
,, ,, (Editorial) ... 186
,, Poultry at, 1916, by F. Sheppard ... 703
,, Salisbury, 1916 ... 690
,, the (Editorial) ... 464
,, this Season's (Editorial) ... 321
Shrubs, Sale of. See "Departmental Notices."
Situations Vacant and Wanted. See "Employment on Farms."
Slaughter Cattle to the Rand (Editorial) ... 182
Sleeping Sickness (Editorial) ... 185
Soldiers, ex-, for the Land (Editorial) ... 780
Sowing Season (Editorial) ... 779
Spraying Potatoes, does it Pay? by R. W. Jack, F.E.S. ... 354
,, ,, Experiments (Editorial) ... 326
Spring Grange Herd (Editorial) ... 182
Statistics, Annual Return (Editorial) ... 1
,, Farm and Live Stock in Southern Rhodesia, 1915, by E. A. Nobbs, Ph.D., B.Sc., and B. Haslewood, F.S.S. ... 238
,, Returns of Crops, 1914-15, by E. A. Nobbs, Ph.D., B.Sc., and B. Haslewood, F.S.S. ... 28
,, Returns of Crops, 1915-16, by E. A. Nobbs, Ph.D., B.Sc., and F. Eyles, F.L.S. ... 784
Stock. See "Farming Calendar."
,, Live. See "Departmental Notices."
,, Stud, on the Government Farm, Gwebi (Editorial) ... 182
,, Thefts (Editorial) ... 8
,, Wounds and Treatment (Correspondence) ... 539
St. Quintin, the late Mr. H. W. (Obituary) ... 91
Striga lutea (Witch Weed), a New Maize Pest, by J. A. T. Walters, B.A. ... 234

Tank, Dipping, Construction of ... 523
,, ,, How to find Capacity of ... 237
Tanks, Dip, Cement in relation to (Editorial) ... 463
Thefts of Stock (Editorial) ... 8
Tick Eradication Day (Editorial) ... 464
Tobacco Crop, 1915-16, Estimates of, by E. A. Nobbs, Ph.D., B.Sc., and B. Haslewood, F.S.S. ... 248
,, Export of, to Britain (Editorial) ... 459
,, Rhodesian, for Australia (Editorial) ... 458
,, See "Farming Calendar."
,, Turkish (Editorial) ... 326
Topping of Mealies (Correspondence) ... 707
Trees, Planting of Gum (Editorial) ... 327
,, Sale of. See "Departmental Notices."
Tyres Ordinance, Width of (Editorial) ... 324

Unsuitable to Southern Rhodesian Conditions, Crops, by J. A. T. Walters, B.A. ... 378

PAGE

Vegetable Garden. See "Farming Calendar."
Vermin, by E. A. Nobbs, Ph.D., B.Sc. 685
Veterinary Reports 113, 265, 400, 546, 711, 850
,, Research (Editorial) 325
,, See "Farming Calendar."
,, Surgeon, Report of Chief, 1915 344
.. Surgeons, Services of. See "Departmental Notices."

Weather Bureau 125, 277, 408, 555, 722, 859
,, See "Farming Calendar."
Weevils, a Defence against (Correspondence) 397, 545
White, J. M., the late (Obituary) 329
Wild Dogs, Destruction of (Editorial) 329
Wilson, E., the late (Obituary) 617
Witch Weed (Striga lutea), a New Maize Pest, by J. A. T. Walters, B.A. 234
Wounds of Stock and Treatment (Correspondence) 539

AUTHORS.

PAGE

L. E. W. Bevan, M.R.C.V.S.—
Immunity, Parts I. and II. ... 640, 800

B. A. Bland—
A Multiple Attachment for Planters and Cultivators ... 515

F. Eyles, F.L.S.—
The Salisbury Oil Factory ... 52
The Salisbury Bacon Factory ... 374
Statistical Returns of Crops, 1915-16 ... 784

C. E. Hall—
Hygienic Production and Handling of Milk ... 369

B. Haslewood, F.S.S.—
Statistical Returns of Crops in Southern Rhodesia, 1914-15 ... 28
Farm and Live Stock Statistics in Southern Rhodesia, 1915 ... 238
Estimates of Maize and Tobacco Crops, 1915-16 ... 248

A. G. Holborow, F.I.C.—
Artificial Fertilisers and the War ... 381
Manuring of Maize on Government Farm, Gwebi ... 506
Additional Fertiliser Experiments on Government Farm, Gwebi 511
Maize Planting with Fertilisers and the Advent of Rains ... 652
A Preservative for Samples of Arsenical Dips ... 816

H. E. Hornby, M.R.C.V.S.—
Determination of Sex in Mammals ... 63

R. W. Jack, F.E.S.—
Rhodesian Citrus Pests, Part I. ... 69
,, ,, Part II. ... 215
Does it Pay to Spray Potatoes in Southern Rhodesia? ... 354
Home-made Fly Papers ... 819

G. S. Money—
Maize Growing on Granite Sand Soils ... 813

J. M. Moubray, A.I.M.M.—
A Source of Potash ... 101

Eric A. Nobbs, Ph.D., B.Sc.—
Statistical Returns of Crops in Southern Rhodesia, 1914-15 ... 28
Farm and Live Stock Statistics in Southern Rhodesia, 1915 ... 238
Estimates of Maize and Tobacco Crops, 1915-16 ... 248
Compulsory Dipping ... 466
Reports on Crop Experiments at Gwebi, 1915-16, Parts I. and II. 474, 659
Vermin ... 685
Statistical Returns of Crops, 1915-16 ... 784

R. H. Scott, M.A., F.R.S.—
Classification of the Clouds ... 103

PAGE

Frank Sheppard—
The Poultry of Rhodesia ... 57, 258
The Marketing of Poultry Products ... 384
Poultry at the Shows, 1916 ... 703
Prevention of Poultry Diseases ... 836

R. C. Simmons—
An Experiment in Beef Production, No. 1 ... 10
The Breeding and Feeding of Pigs for Bacon Factory Purposes (Revised) ... 187
Beef Feeding Experiment No. 2 ... 620
Shedding for Milch Cows on Rhodesian Farms ... 678

J. M. Sinclair, M.R.C.V.S.—
Compulsory Dipping ... 466

F. Sworder—
Notes on Bee Keeping ... 92, 831

A. G. Turner—
Export of Rhodesian Citrus Fruits ... 84
Citrus Fruit at the Shows, 1916 ... 699

J. A. T. Walters, B.A.—
Maize Grading, 1915 ... 45
Napier's Fodder or Elephant Grass ... 87
Witch Weed or Rooi Bloem, New Maize Pest ... 234
Crops unsuitable to Southern Rhodesian Conditions ... 378
New Crops for Rhodesia, 1915-16 ... 626
Co-operative Experiments ... 822

W. M. Watt—
Hints on Cement Concrete ... 518

F. B. Willoughby—
Eucalypts suitable to Southern Rhodesia and how to grow them 361
Notes on Propagation by means of Cuttings in Southern Rhodesia 388

W. S. Wood—
Dehorning of Cattle in Rhodesia ... 252

ILLUSTRATIONS.

	Facing Page
Oil Factory, Interior of	February Cover
Shorthorn Bull, "Bilsington Imperieuse"	February Frontispiece
,, "Bilsington Intrepid"	4
,, "Bilsington Hornet"	5
Half-bred Aberdeen Angus Bullock, Fat Stock Show, Salisbury	14
Joints of Beef cut from half-bred Aberdeen Angus and North Devon Bullocks	14
Half-bred North Devon Bullocks	15
,, Aberdeen Angus Bullocks	15
,, Shorthorn Bullocks	15
Oil Factory, Salisbury	54
Soap and Oil made at the Oil Factory, Salisbury	54
Rhodesian Citrus Pests (3)	78
Napier's Fodder (Elephant Grass) (2)	88
,, ,, (2)	90
Government Forest Nursery	98
Eucalyptus saligna at Government Nursery	98
Cattle Dipping Tanks (2)	107
Pedigree Hereford Bulls, Spring Grange Farm	April Cover
Spring Grange Homestead	April Frontispiece
Imported Hereford Heifers, Spring Grange	April Frontispiece
Chindamora Dip (2)	181
Pedigree Hereford Bull "Grasham," with Progeny, Spring Grange Farm	182
Grade Hereford Heifers and Calves, Spring Grange Farm	182
Side of Bacon (Diagram)	188
A Pig Wallow	188
Young Berkshire Sows	189
Pig Sty (Plan) (Diagram)	210
,, (Elevation) (Diagram)	213
Citrus Pests	220, 221, 224, 228, 232
Span of young Hereford Oxen bred on Colne Valley Farm	June Cover
Eucalyptus Seeds	364
,, ,, ...	365
,, ,, ...	366
,, ,, ...	367
Potato Plant dying from Early Blight	356
Experimental Plot of Potatoes Sprayed and Unsprayed	357
Interior of Bacon Factory (2)	376
Mr. C. F. Browning's South Devon Bull "St. Patrick"	August Cover
Challenge Cup, Bulawayo Agricultural Society	August Frontispiece
South Devon Bull "St. Patrick"	458
Typical Berkshire Boar "Baron Kitchener"	460
A Herd of Berkshires, shewing Sties	461
Mr. Drummond Forbes's "Lomond"	490

	Facing Page
Mr. Jobling's Hereford Bull "Devonby Dreadnought"	492
,, ,, "Devonby Democrat"	494
,, two-year-old Heifer "Devonby Dryad"	498
,, half-bred Hereford Steer	502
Bland's Multiple Planter	516
A Typical Dipping Tank	526
A Dipping Tank in use	526
Drawing of Dipping Tank	530
View of the Sabi River	534
Guinea Grass (Panicum maximum)	632
Jack Bean (Canavalia ensiformis)	632
Feterita Kaffir Corn	636
Beggar Weed (Desmodium tortuosum)	636
Dry and Wet Fertiliser Soil (Diagram)	654
A Good Crop of Majorda Melons at Premier Estate	666
A Cow Shed (Diagram)	680
Hay-making on Mr. T. W. Savory's Farm	692
Bulawayo Waterworks Dam	December Frontispiece
Group of North Devon Bulls undergoing Inoculation	792
North Devon Bulls	792
Half-bred Shorthorn-Ayrshire Heifer	808
Case of Horse-sickness (Dikkop)	808
Cases of Horse-sickness (Dikkop) (2)	809
Agglutination Test	809
A Honey Comb naturally built (2)	832
,, ,, drawn out by the Bees	834
,, ,, in which the Bees have been reared	834
A Shallow Honey Comb Frame	835
Gradual Progress of Honey Comb	835

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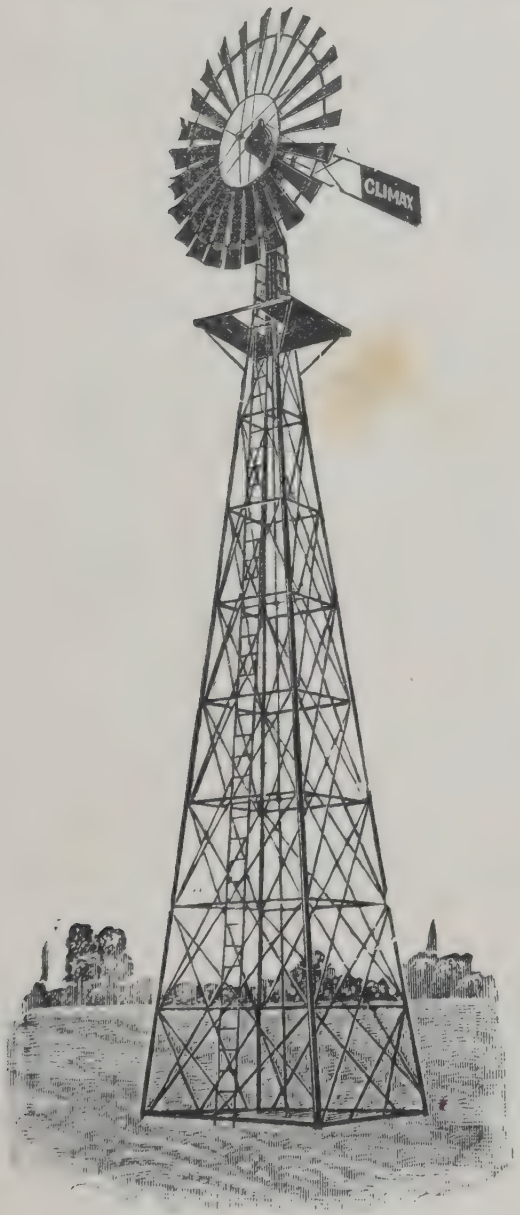

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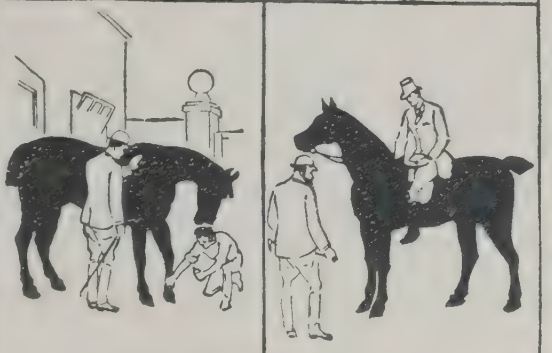

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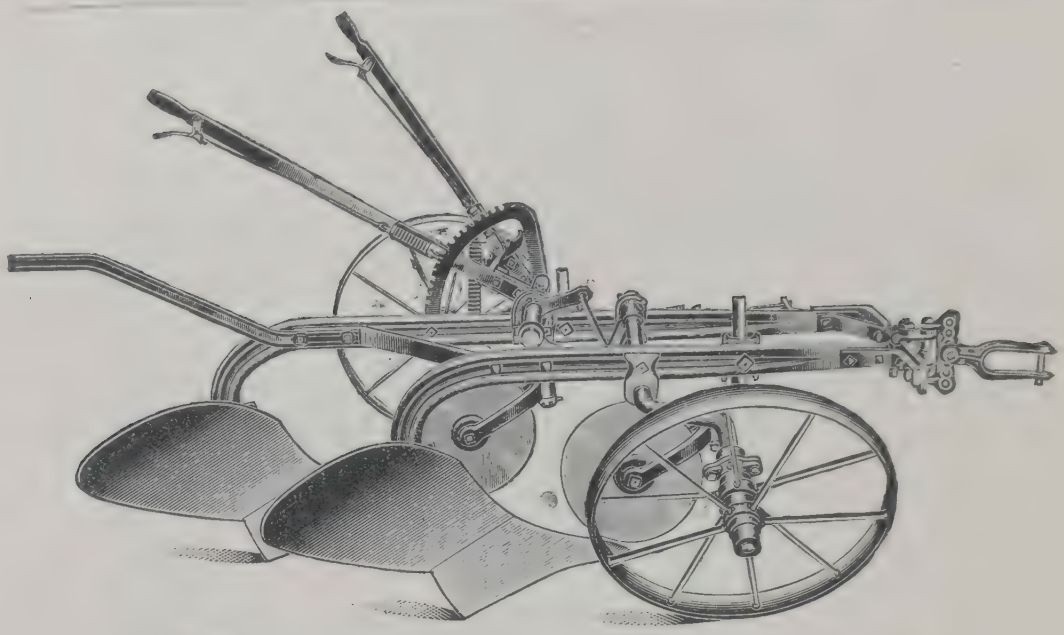

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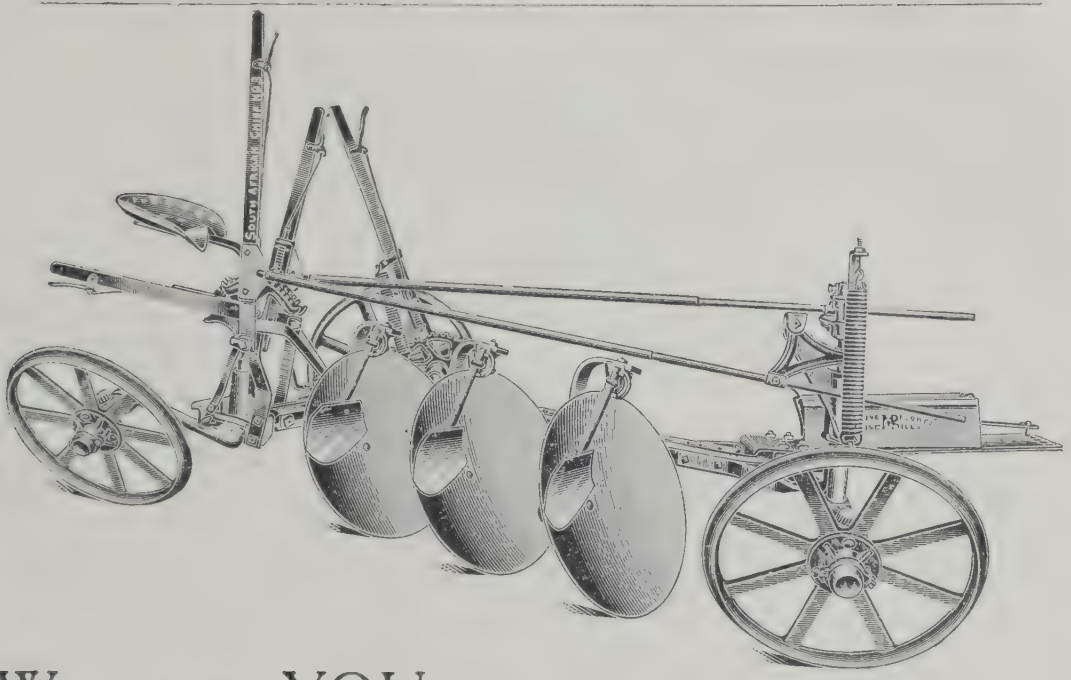

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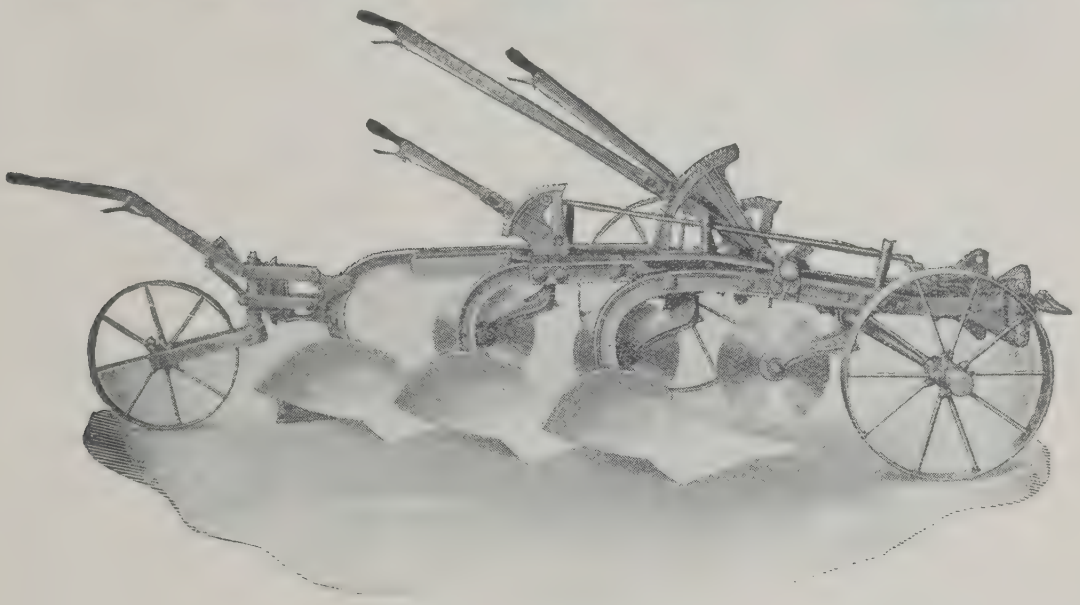

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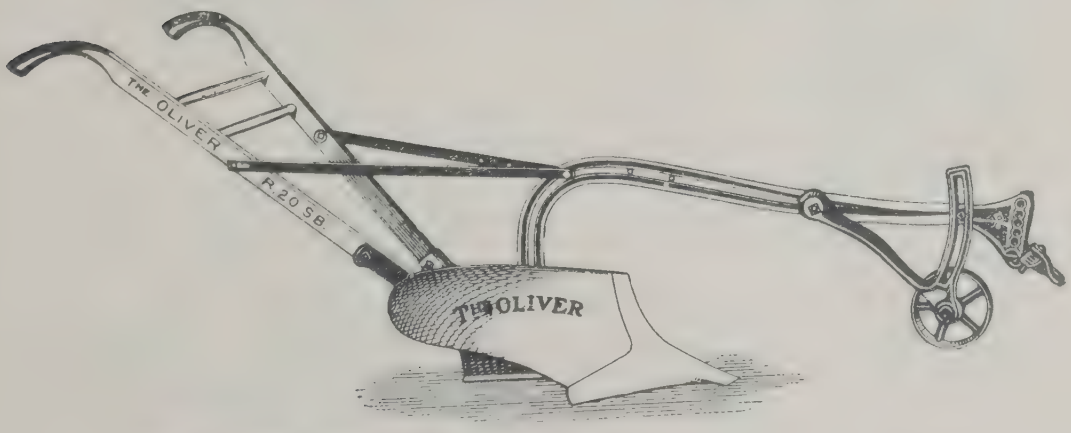

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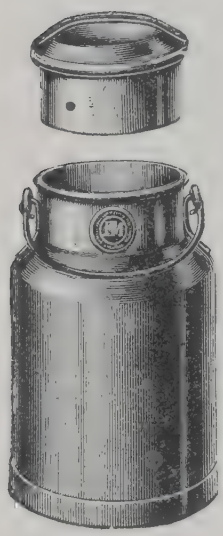

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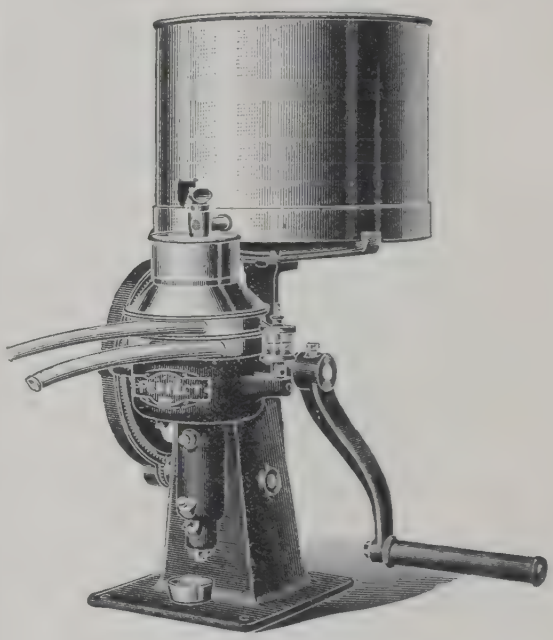

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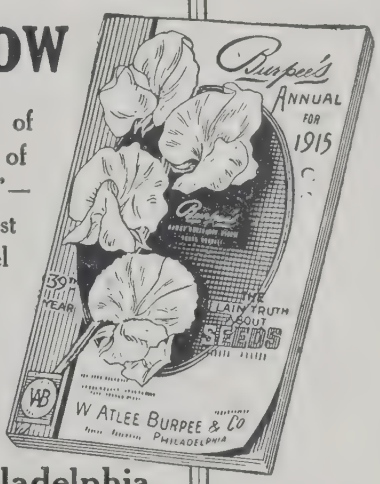

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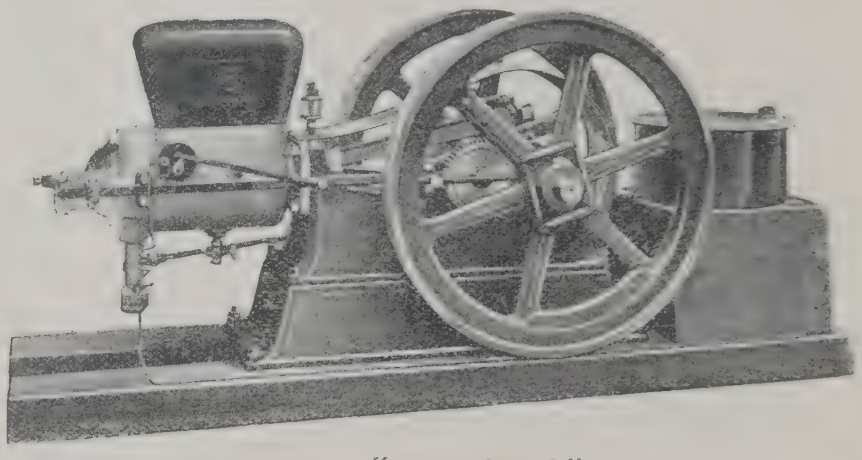

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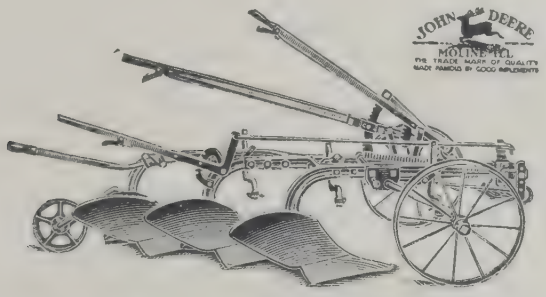

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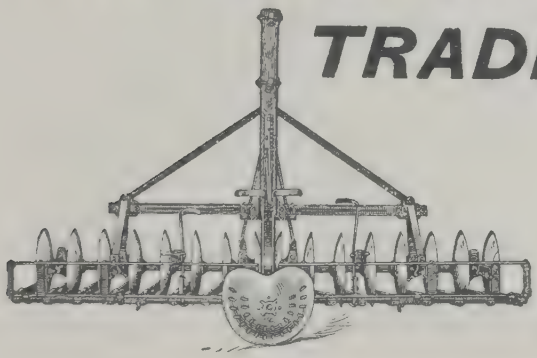

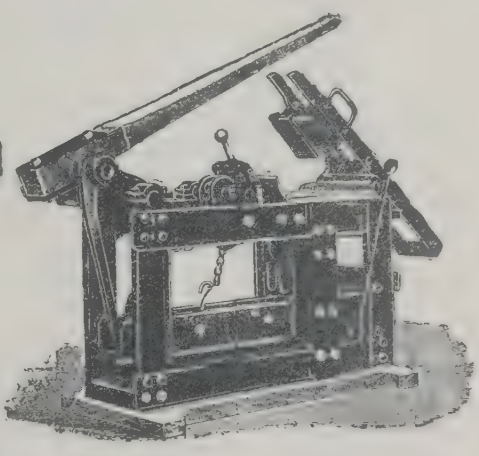

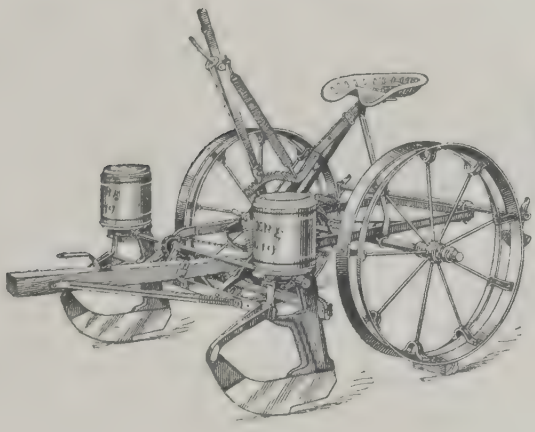

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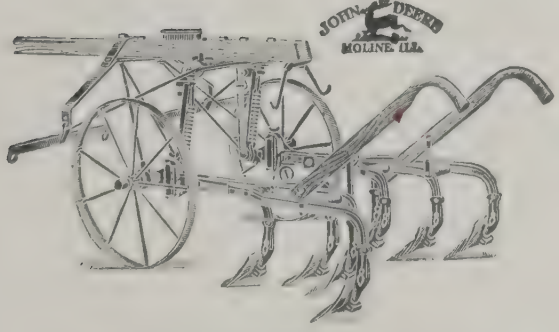

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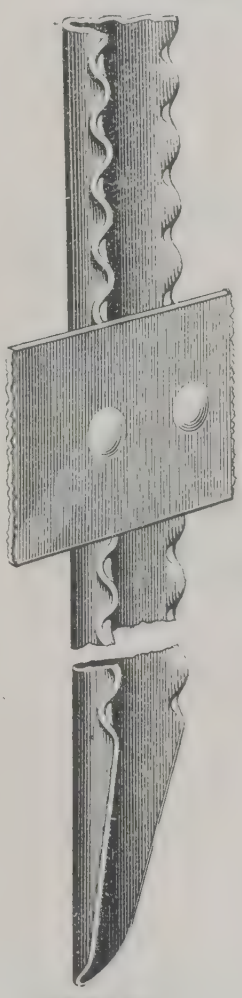

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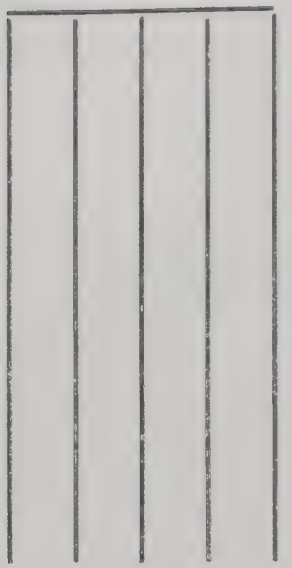

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Table of Contents.

EDITORIAL :

PAGE

Annual Statistical Return ... 1
Fattening Experiments ... 2
Importation of Pedigree Shorthorns ... 4
Labour Bureau Fees ... 5
Sources of Potash ... 6
Campaign against Cutworms ... 8
Stock Thefts ... 8

ARTICLES :

An Experiment in Beef Production, by R. C. Simmons ... 10
Statistical Returns of Crops in Southern Rhodesia for the Season 1914-15, by Eric A. Nobbs, Ph.D., B.Sc., and B. Haslewood, F.S.S. ... 28
Maize Grading, 1915, by J. A. T. Walters, B.A. ... 45
The Salisbury Oil Factory, by F. Eyles, F.L.S. ... 52
The Poultry of Rhodesia, by Frank Sheppard ... 57
Determination of Sex in Mammals, by H. E. Hornby, M.R.C.V.S. 63
Rhodesian Citrus Pests, by Rupert W. Jack, F.E.S. ... 69
Export of Rhodesian Citrus Fruit, by A. G. Turner ... 84
Napier's Fodder or Elephant Grass, by J. A. T. Walters, B.A. ... 87
The Late Mr. H. W. St. Quintin ... 91
Notes on Bee Keeping, by Frederick Sworder ... 92
The Government Forest Nursery, Salisbury ... 98
A Source of Potash, by J. M. Moubray, A.I.M.M. ... 101
Classification of Clouds, by Robert H. Scott, M.A., F.R.S. ... 103
Correspondence ... 107
Departmental Correspondence ... 108
The Agricultural Outlook ... 112
Veterinary Report for November and December, 1915 ... 113
Farming Calendar ... 116
Market Reports ... 122
Weather Bureau ... 125
Dates of Meetings of Farmers' Associations ... 132
Departmental Notices ... 133
Departmental Bulletins ... 144
Employment on Farms ... 148
Government Notices ... 150

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THE RHODESIA

Agricultural Journal.

Edited by the Director of Agriculture,
assisted by the Staff of the Agricultural Department.

PUBLISHED BI-MONTHLY.

VOL. XIII.—NO. 1.] FEBRUARY, 1916. [5s. per annum.

Editorial.

Correspondence on subjects affecting the farming industry of Southern Rhodesia is invited. Enquiries will be replied to direct, or through the medium of the JOURNAL. *An interchange of ideas and suggestions between farmers will be particularly welcomed. Contributions of a suitable nature for insertion in this* JOURNAL *will be much appreciated. All communications regarding these matters, and advertisements, should be addressed to the Editor, Department of Agriculture, Salisbury.*

ANNUAL STATISTICAL RETURN.—In this issue are published tables shewing the acreages and yields of various crops for Southern Rhodesia for the season 1914-15, together with an exhaustive article dealing with the outstanding features thereof. We, therefore, need to say little here, beyond calling attention to the subject, and suggesting to farmers that a careful study of the figures given will repay them. Of particular value will be consideration of the differences of yield for a given crop in different districts, for they will serve as a guide to new settlers and others as to the crops that may be expected to give profitable returns in any neighbourhood. No

one need now experiment to find out which of our staple crops will suit his land, for the statistics give him a general indication. Perhaps the most remarkable returns are those for tobacco, maize and citrus. The startling fall in the production of tobacco is not due to agricultural reasons proper, but to causes arising from difficulty in organising markets. The capacity of Rhodesia to produce profitable leaf is inherent, and there is no ground to doubt that the tobacco industry will in time recover. The great increase of maize, both in acreage and output, together with the tendency of this crop to gravitate to the true maize belt, is most promising. Continued steady growth, with careful maintenance of present high reputation for quality, will ensure Rhodesia a permanent place in the grain markets of Europe. The expansion of the citrus industry now seems to be assured. Most gratifying reports on oranges sent from this Territory last year have been received from Europe, and are referred to in detail on another page of this *Journal*. They fully warrant the large investment of capital in orchards shewn in the statistical tables, and should encourage further increases in this direction.

The statistics now given are more complete than those for the previous year, and we hope each year to move forward and make the tables more and more comprehensive. To do this, we must rely upon the continued loyal support of every farmer in the country. To make the returns perfectly reliable, the furnishing of statistics by farmers must be universal.

Fattening Experiments.—The report of the Gwebi experiments in stall-feeding of cattle, published in this issue, will be read with keen interest by many farmers who hope to be able to market a large proportion of their crops in the form of beef instead of in the raw form of grain and forage. The results will come as a surprise to many, for at first sight they would appear to condemn the practice of stall-feeding, and to shew little or no financial profit in the undertaking. Such a superficial conclusion would, however, be misleading. Many factors have to be taken into consideration, and the commercial figures of one small example suffering under peculiar conditions must not be taken as conclusive. Throughout the

explanations given by Mr. Simmons, it will be observed that the results tend to shew that on general principles the stall or kraal-feeding of cattle is calculated to fatten them very much faster, and to finish them much more perfectly than the rough and ready methods of the veld.

The price of meat per 100 lbs. is a factor of the utmost importance. Salisbury is at present, owing to quarantine restrictions, a closed market with a fixed and strictly limited capacity, and prices accordingly rule low. Farmers are, however, not obliged to send in their fat cattle to market within a quarantine area, and can sell direct to visiting butchers; thus, though losing the competitive element of auction, they yet retain the whip hand of the bargain by keeping the cattle on the farm, and not being compelled to sell.

It is apparent that butchers here have yet to realise more fully the difference in value of the high quality meat of stall-fed cattle compared to the ordinary beast, and the much higher proportion of dead weight to live weight in a properly prime fed carcase. The particulars given regarding the meat of such animals in a concrete instance are of particular interest.

No doubt the figures taken in this experiment as the farm value of grain and forage given to the fattening bullocks will be scrutinised. The precise figures vary on different farms, and every farmer has his own ideas of what it costs him to produce a crop. The profit, it should be remembered, is only to be made once, and the question arises whether direct sale or conversion into meat is the better course. This each individual must decide for himself, according to the circumstances of his case.

It is an axiom of scientific enquiry that an experiment having negative results is often as valuable as one having positive results. The experiment in cattle fattening with which we are dealing has produced results which are apparently negative, but none the less instructive. By it the following facts seem to be proved, some of which had not previously been demonstrated:—

That prime quality beef, fit to compete in the world's markets, can be produced in Rhodesia, without the use of any purchased feeding stuffs.

That high grade animals respond to artificial feeding, but native scrubs do not.

That the fattening of cattle by full stall-feeding, commencing at the end of summer, is likely to give more positive and profitable results.

That in further experiments improvements may be looked for in the directions of quantity and cost of feeds, and reduction in general expenses, further tending to reverse the apparent pecuniary results of this experiment.

That the true result of the experiment was obscured by the abnormal condition of the local market for meat.

That the regular supply of really prime beef on the local market will create a demand for same, with consequent increase of price in proportion to its true value compared with rough veld beasts.

That farm crops, in addition to maize, can be profitably turned into beef.

Importation of Pedigree Shorthorns.—Mr. George Fath, of Plumtree, has made a valuable addition to the stud stock of the country by the purchase, in November last, of two Shorthorn bulls and eight heifers from the well-known Bilsington Priory herd of Mr. R. T. Balston, Ashford, England, at a cost of something over £1,200. These cattle have been placed on Mr. Fath's farm Fairfield, in the Plumtree district, and should do much to improve the type of Shorthorn in his neighbourhood.

The Bilsington herd has been bred with a view to producing dual purpose animals, and to this end very first-class beef bulls have been used on cows of deep milking qualities. The elder bull, "Bilsington Intrepid," calved in April, 1912, is by "Tehidy Robin Hood" 97420 (which also sired the champion cow "Dewlap"), out of "Doris 7th" by "Golden Drop Pride" 83595, the highest priced Duthie calf of his year. "Bilsington Imperieuse," calved in May, 1914, is out of a five-gallon cow by "Edgcote Falcon" by "Ascot Clipper," which was out of a deep milking cow by "Collynie Monarch" 94686. The heifers, of course, are all bred on the same lines.

Photo by W. Fray. "Bilsington Intrepid" 114331, owned by Mr. Geo. Fath. Bloemfontein.

Photo by W. Fray. "Bilsington Hornet" 124333, owned by Mr. J. Grant Riach. Bloemfontein.

Mr. J. Grant Riach, also of Plumtree, purchased a very nice bull from the same herd, called "Bilsington Hornet."

Needless to say, all are very first-class cattle, full of quality and Shorthorn character. We congratulate their owners on their enterprise, which we sincerely hope will repay them handsomely. We are enabled to reproduce photos of the bulls mentioned in this issue.

Labour Bureau Fees.—The reduction in capitation fees made by the Native Labour Bureau as from 1st January deserves some notice, for it is a matter of great importance to the farming community. It will be remembered that originally the fee to miners was £5 and to farmers £2. A good deal of ill feeling resulted from this differentiation. The mines as a whole felt they were not fairly treated; many of the small workers declared they were as ill able to pay the higher fee as the farmers; and the farmers themselves were in the invidious position of having a part of their labour expenses paid by the mines. In May, 1915, an agreement was come to between the two industries whereby a uniform fee of £3 10s. was accepted. By a slight reduction of the monthly wage payable, and by an arrangement to spread the collection of the capitation fee over a period, the farmers' difficulty was overcome. The manager of the Bureau then started a campaign to induce all employers of native labour to take a larger proportion of their supply from the Bureau, his argument being that further support to the Bureau would result in further reduction of fees. The campaign was successful, and the promised result has materialised. First a reduction of 10s. was made, and now another 5s. has been taken off the fee, bringing it down to £2 15s., or 15s. less than last May. We are assured that this policy will still be followed. Therefore it would appear to be to the benefit of the farmers if they continue to increase the proportion of labour they take from the Bureau, so that in time the fee may be brought to a minimum. Probably many employers are at present independent of the Bureau by reason of the good supply of volunteer labour, but there is no guarantee that these conditions will last for ever, and the strengthening of the hands of the Bureau must tend to stability in the labour market.

Probably few farmers are aware of the perfect system that is employed by the Bureau to obtain the best quality of labour, and the extreme care that is taken to deliver the labourers to their employers in healthy condition. The arrangements at the Bureau compound, near Salisbury, are as nearly complete as possible. Any one who visits it will see that the "boys" there are physically of a sturdy standard. There is now no difference made between the class of native supplied to the farmer and the miner. Although some of the labourers come off their long foot journey somewhat "tired," the food served them on arrival is so plentiful and varied that they soon become quite fit. Every individual is submitted to close medical inspection, and only those free from disease are distributed. A fully equipped hospital awaits those who are sick, with regular medical attendance. The water supply is unlimited for all purposes, and the sanitary arrangements are so good that scarcely a fly can be seen. To illustrate the completeness of the organisation, we saw 700 natives served with a ration of porridge, soup and meat in less than fifteen minutes without noise or confusion. The "boys" who have formed the habit of engaging themselves through the medium of the Bureau seem to appreciate its advantages, and from the employer's point of view, when he engages Bureau natives, he is as sure as human means can make him that he will secure a sound, healthy labourer for a fixed period.

Sources of Potash.—Considerable attention is being paid the world over to possible sources of potash for industrial and manurial purposes. In some interesting notes on the subject, Mr. J. M. Moubray, A.I.M.M., of Chipoli, Shamva, refers to the presence of potassium in many of our rocks in enormous abundance, but in such a state of insolubility as to be unavailable to plant life as a food, and, therefore, of no immediate manurial value. He goes on to suggest certain experiments with a view to crushing these potash-bearing minerals on the principle, apparently, that the minute particles weathering more rapidly than the solid crystals will liberate potash in soluble form.

This method has been adopted with success in the case of

certain phosphatic fertilisers, as in the well-known case of basic slag, which is of value in proportion to its degree of fineness, that is, of its mechanical disintegration. The case of phosphates in basic slag is, however, hardly analogous, as most of the phosphoric oxide in slag is already soluble in 2 per cent. citric acid solution, and therefore in a condition easily assimilated by the plant, if fine enough. Potash in felspar, etc., is not soluble in 2 per cent. citric acid solution, and until it becomes so by weathering, it is not available for the plant.

Of the primitive rocks which contain potash the most important are:—

Potash felspar, containing, if pure, 9 per cent. potash (K_2O)

Potash mica, containing, if pure, 9.8 per cent. potash (K_2O)

Leucite, containing, if pure, 12.5 per cent. potash (K_2O)

By the decay of the primitive rocks, potash has been spread all over the earth as part of the arable soil. The silicates of potash are so stable that, however finely they may be ground before application to the land, some considerable time must elapse before the potash becomes available to the plant, and then only by degrees. How many years this weathering operation takes it is difficult to say.

In this connection it is to be recollected that even the war will not last for ever, and that on the resumption of normal conditions the enormous deposits of soluble potassic minerals at Stassfurt in Germany will again be free to supply the world's demands at prices which have in the past, and may, therefore, be expected in the future, to render all other sources of potash commercially unprofitable.

The statement has appeared in the press that soda may be substituted for potash. Whilst in a measure true, this bald assertion requires some qualification, which was lacking. When in any soil certain mineral elements of plant food are deficient, they may in some degree, but not in their entirety, be replaced by other nearly allied elements, and to some extent sodium replaces potassium, but not altogether, and not suffici-

ently to render the latter unnecessary. The idea could easily be carried too far and reduced to an absurdity.

Our soils are fortunately not as a rule lacking altogether in potash, and comparatively small applications are found in practice to suffice. Sources of potash deserving consideration in a time like the present are ash of all kinds, and urine, which is so often allowed to be wasted, instead of being incorporated with the manure or saved in a cess-pit. As regards quantities to apply, this depends much on the crops and on the fertility of the soil, but broadly speaking, no one is likely to apply too much, as the quantity of potash available in these materials is, at best, small, though fortunately accompanied, as a rule, by other fertilising constituents.

Campaign against Cutworms.—We are glad to notice that the methods of attacking the cutworm pest recommended by this Department are being increasingly adopted by the farmers of Rhodesia, in some cases on a large scale, and nearly always with satisfactory results. Last season one farmer distributed poisoned bait over no less than 300 acres; many others baited smaller plots, and all expressed themselves well pleased. In one instance a farmer first planted 40 acres to maize, but obtained no stand whatever, owing to the ravages of cutworms. He then applied bait, and replanted, and he estimates that he subsequently obtained a 90 per cent. stand of maize. Particulars of the injurious work of cutworms and the preventive measures recommended for resisting their attacks will be found in the *Rhodesia Agricultural Journal* for June, 1912, in an article on "Some Insect Pests of Maize," by the Government Entomologist, Mr. R. W. Jack.

Stock Thefts.—The attention of the public is called to section 23 of the "Stock and Produce Theft Repression Ordinance, 1907," which reads as follows:—

"Any person who shall, by way of purchase, bargain, exchange or gift, acquire or receive into his possession from

any other person any stolen stock or produce, without guilty knowledge that the said stock or produce is stolen, but without having reasonable cause, proof of which shall lie on such first-mentioned person, for believing at the time of such acquisition or receipt that the said stock or produce was the property of the person from whom he received it, or that such person was duly authorised by the rightful owner to deal with or dispose of it, shall be deemed guilty of contravening this section, and shall be liable on conviction to a fine not exceeding one hundred pounds, or to imprisonment, with or without hard labour, for a period not exceeding twelve months, or to both such fine and such imprisonment."

It is not enough merely to take the word of persons, especially natives, offering stock for sale, that such stock belongs to them, but unless the person offering such stock for sale is known to the purchaser, other evidence should be demanded of the ownership of the stock.

Under section 40 of the same Ordinance, persons travelling about acquiring stock from natives must report every purchase to the Native Commissioner of the district within fourteen days of the purchase, giving a full description of the stock purchased, and the manner and locality in which the stock was obtained. The penalty for non-compliance with section 40 is a fine of £25 or three months' imprisonment, or both.

An Experiment in Beef Production.

By R. C. Simmons, Chief of the Animal Industries Branch.

There have been persons at times who doubted the potentialities of Rhodesia as a cattle country, and from their pessimistic prognostications grave doubts have arisen in many minds as to the possibility of producing, on a commercial scale, a beef carcase fit for the European market. The general experience of the larger breeders during recent years has created a much more optimistic tone amongst them. This, together with certain economic conditions arising out of the war, has brought the whole question of beef production for export prominently before the country.

It is unnecessary here to take up the reader's time in a lengthy explanation of the fact that the production of beef for oversea markets implies the improvement both in the type of cattle and in our feeding methods, because "grading up" and artificial "finishing" in some form have been accepted as the basis on which successful export of beef must rest. Very closely bound up with the production of first-class artificially-fed beef is the desire for some means of using our surplus maize and many of those crops which may often be so easily grown, but for which there is absolutely no market as raw material. Not only has the farmer been seeking an outlet for these crops in order to avoid having his eggs, in the form of maize, all in one basket, as it were, but he recognises that much of the agricultural land in the country either requires, or very soon will require, a system of farming which will include a regular change of crops, and the production of manure with which to replenish the soil.

Early in 1915 the Department of Agriculture began to take some steps towards obtaining definite local data in regard

to the stall or artificial feeding of slaughter bullocks. The necessary funds and equipment for an elaborate and highly scientific experiment were not available, but it appeared possible, with the means at hand, to carry out a simple practical test of the amount and kinds of food required to fatten an animal, the time required to feed him and so forth, and, incidentally, to get an indication of the lines on which further investigation should be conducted. The following experiment was, therefore, planned and carried out under the close supervision of the writer, with the able assistance of Mr. Wynn, who personally attended to the feeding.

In May, 1915, 24 bullocks were purchased, consisting of six half-bred Shorthorns, six half-bred Aberdeen Angus, six half-bred North Devons and six common Mashonas. All were calved in the season 1912-13, and none of them had ever been inspanned or artificially fed in any way. The idea of the experiment was primarily to ascertain whether or not it would be worth the while of the farmers in the richer agricultural districts to buy stores from graziers or ranchers in Matabeleland, or elsewhere, and to fatten them. The work was, therefore, carried out on the Government farm at the Gwebi, which is typical maize land. It was resolved to use no food whatever other than that grown on the farm.

The Shorthorn and Aberdeen Angus bullocks were bought from Messrs. Dimmock & Rawson at £7 5s. per head on rail. They were by a Colonial-bred Shorthorn bull and an imported Aberdeen Angus bull (both pure) out of German East African Angoni cows. The North Devons were bought of Messrs. Coles & McKenzie, of Gwelo, and were valued to the Department by Mr. Grieve, of Salisbury, at £8 5s. on rail at Salisbury. They were by a pure Colonial-bred North Devon bull out of Victoria cows. The six native bullocks were such as could have been bought in the ordinary course of business for £5 a head on rail. Bearing in mind that it is essential, from the feeder's point of view, that he should purchase only thrifty well-formed animals, all those obtained were in good condition, and shewed signs of strong constitution and tendency to flesh production. Their combined purchase price amounted to 17s. 8d. per 100 lbs. live weight, which was a fair market price at the time.

The bullocks were divided into three lots of eight, containing two of each breed. As those of any one breed were not all of the same size, each pair was arranged so that it contained a smaller and a larger bullock, which were together as nearly as possible equal in value and weight to other pairs of the same breed. They were thereafter dealt with and considered in pairs, thus eliminating a certain amount of error due to individual temperament.

Lot 1.—On the 1st of June, these were placed in a small yard with a lean-to shed, a manger and a constant supply of water, and it was arranged that they should remain in the yard entirely, having all their food artificially supplied until the Salisbury fat stock sale on 15th December.

Lot 2.—These were grazed quietly during the day from 8 a.m. to 4 p.m. on the better grazing within about a mile of the homestead, with an occasional run on maize stalks, etc. They were herded with six young bulls. At 4 p.m. each day they were placed in a yard similar to that occupied by Lot 1, and received an evening and morning meal in the same way as Lot 1.

Lot 3.—These were placed in an enclosed 1,000 acre camp, with access to a hay rick and water. Except for a weekly dipping, which took place within a mile of the camp, they received no attention whatever. The camp contained plenty of shelter, but the grass was old and rather coarse until September, when a part of it was burnt, and subsequently provided excellent grazing.

It will be recognised that, as the bullocks had to be obtained in various parts for the purpose of the experiment, and as Salisbury was the only place at which they could be weighed, several items of expenditure were incurred which would not occur in the course of an ordinary commercial transaction. An account of such expenditure is of no value to the reader, and the sum of 10s. has therefore been added to the purchase price of each bullock on the farm as representing the average commercial cost of conveying such a beast from, say, somewhere in the Midlands to the Mazoe or Gwebi districts. The Devon bullocks had been on hand some few days before the experiment started, so a further 2s. per head was added to their cost at the 1st June.

On the 1st June, when the experiment started, each lot was made up as follows:—

TABLE I.

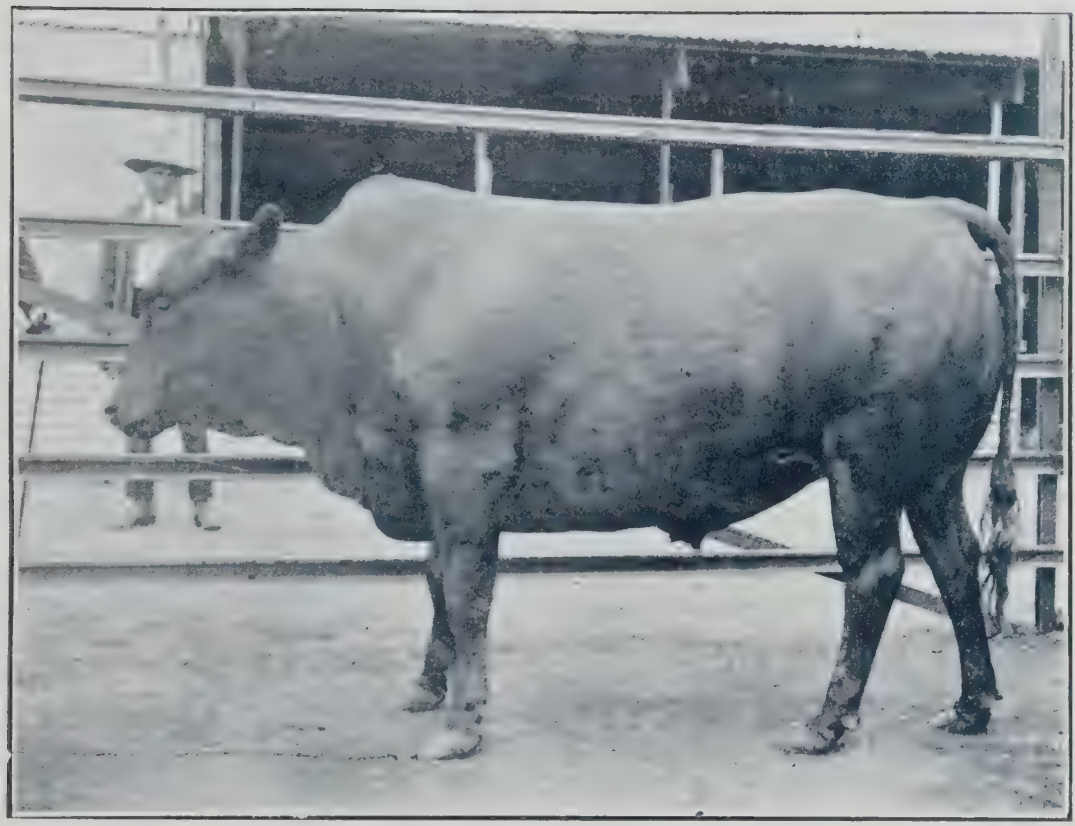
Pairs of Bullocks.	Age.	Combined Live Weight.	Estimated Combined Dead Weight.	Combined Cost on the Gwebi Farm.
		lbs.	lbs.	£ s. d.
Two half-bred North Devons ...	2½	1,698	933	17 14 0
Two half-bred Aberdeen Angus ...	,,	1,712	941	15 10 0
Two half-bred Shorthorns ...	,,	1,746	960	15 10 0
Two Mashonas ...	,,	1,133	566	11 0 0

Note.—The live weights were obtained by weighing each lot of six in truck on Salisbury Station, dividing carefully into pairs and taking the average. The dead weights were estimated by competent butchers knowing the live weights.

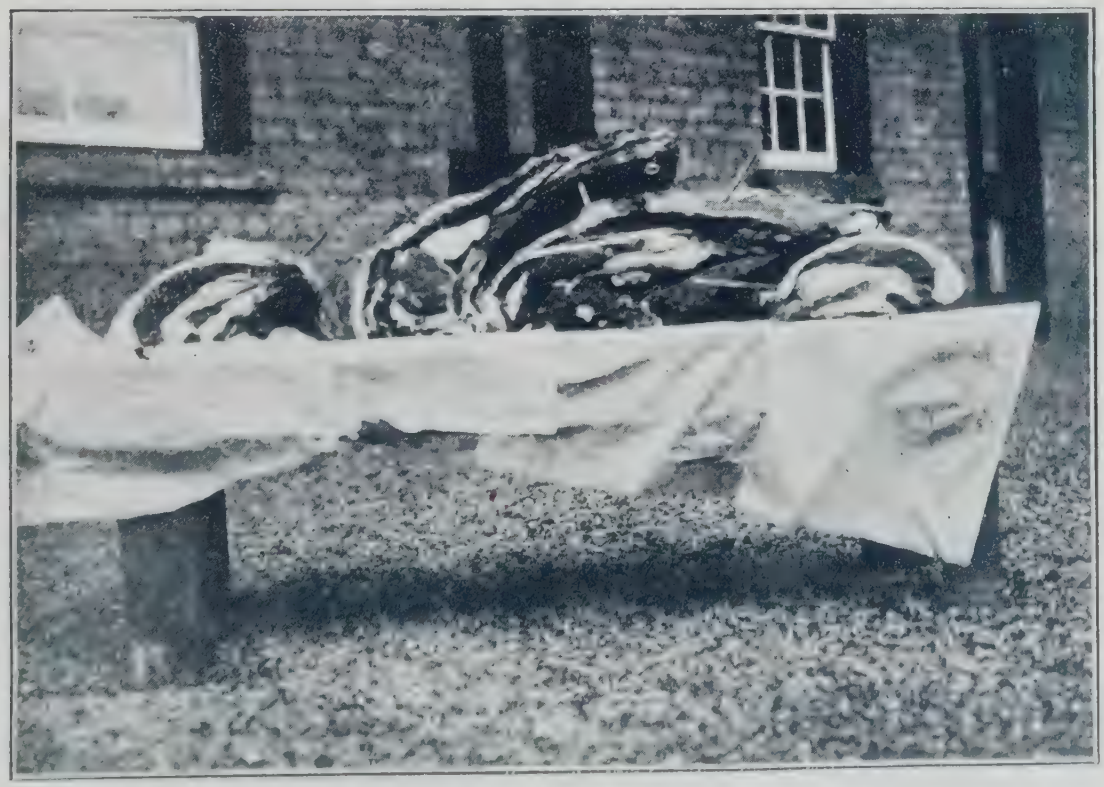
The result of the several lots when sold at Messrs. Whitfield & Co.'s sale, on 15th December, and subsequently killed, was as follows:—

TABLE II. Lot 1.—Entirely Stall Fed.

Bullocks, in Pairs.	Original Estimated Dead Weight.	Actual Ultimate Dead Weight.	Estimated Gain in Dead Weight.	Original Cost on Farm.	Cost of Feeding for 6½ months.	Total Cost delivered in Salisbury Market, including Railage, etc.	Price Realised on Salisbury Market.	Cash Profit.	Cash Loss.	Approximate Price Realised per 100 lbs.
	lbs.	lbs.	lbs.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Two half-bred North Devons	933	870 / 616 } 1,486	553	17 14 0	6 8 2	26 2 2	26 0 0	...	0 2 2	1 15 0
Two half-bred Aberdeen Angus	941	750 / 700 } 1,450	509	15 10 0	6 8 2	23 18 2	31 10 0	7 11 10	...	2 5 0
Two half-bred Shorthorns	960	672 / 572 } 1,244	284	15 10 0	6 8 2	23 18 2	22 0 0	...	1 18 2	1 15 0
Two Mashonas ...	566	452 / 376 } 828	262	11 0 0	6 8 2	19 8 2	15 10 0	...	3 18 2	1 17 0



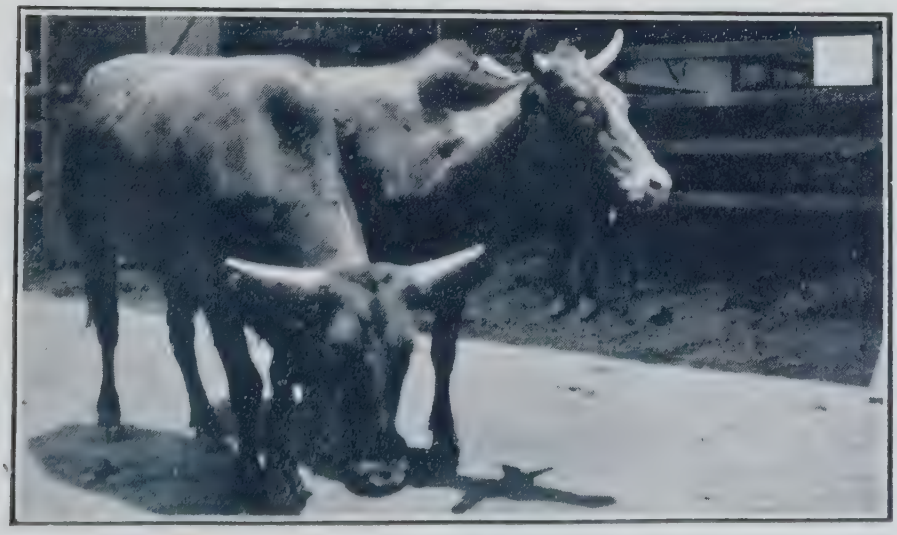
Half-bred Aberdeen Angus Bullock; winner of cup for best slaughter ox, Salisbury Fat Stock Show.



Joints of beef cut from half-bred Aberdeen Angus and half-bred North Devon Bullocks.

Half-bred North Devon Bullocks in Lot 1.

Half-bred Aberdeen Angus Bullocks in Lot 1; winners of cup for best pair of slaughter oxen.



Half-bred Shorthorn Bullocks in Lot 1

TABLE III. Lot 2.—Fed and Grazed.

Bullocks, in Pairs.	Original Estimated Dead Weight.	Actual Ultimate Dead Weight.	Estimated Gain in Dead Weight.	Original Cost on Farm.	Cost of Feeding for 6½ months.	Total Cost delivered in Salisbury Market, including Railage, etc.	Price Realised on Salisbury Market.	Cash Profit.	Cash Loss.	Approximate Price Realised per 100 lbs.
Two half-bred North Devons	lbs. 933	lbs. 740 / 670 1,410	lbs. 477	£ s. d. 17 14 0	£ s. d. 4 16 10	£ s. d. 24 10 10	£ s. d. 25 15 0	£ s. d. 1 4 2	£ s. d. ...	£ s. d. 1 16 0
Two half-bred Aberdeen Angus	941	500 / 603 1,103	162	15 10 0	4 16 10	22 6 10	21 10 0	...	0 16 10	1 19 0
Two half-bred Shorthorns	960	658 / 578 1,236	276	15 10 0	4 16 10	22 6 10	22 0 0	...	0 6 10	1 15 0
Two Mashonas ...	566	356 / 360 716	150	11 0 0	4 16 10	17 16 10	12 0 0	...	5 16 10	1 13 6

TABLE IV. Lot 3.—Grazed only.

Bullocks, in Pairs.	Original Estimated Dead Weight.	Actual Ultimate Dead Weight.	Estimated Gain in Dead Weight.	Original Cost on Farm.	Total Cost delivered in Salisbury, including Maintenance, Dipping, Railage, etc.	Price Realised on Salisbury Market.	Cash Profit.	Cash Loss.	Approximate Price Realised per 100 lbs.
	lbs.	lbs.	lbs.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Two half-bred North Devons	933	492 + 500 = 992	59	17 14 0	18 14 0	20 0 0	1 6 0	...	2 0 0
Two half-bred Aberdeen Angus	941	490 + 546 = 1,036	95	15 10 0	16 10 0	19 0 0	2 10 0	...	1 16 6
One half-bred Shorthorn ... (One beast became too wild to handle)	480	554	74	7 15 0	8 5 0	9 15 0	1 10 0	...	1 15 0
Two Mashonas	566	356 + 348 = 704	138	11 0 0	12 0 0	12 0 0	...	...	1 14 0

It must be carefully borne in mind that an experiment such as the one under consideration cannot be taken as proving anything. The results can only be regarded as indications, and as a guide for further investigation. There are several points of view from which the foregoing tabulated results may be profitably considered, and it will simplify matters to discuss them as seen from each point separately.

Effect of Breed.—It would be unfair to attach much importance to the effect of breed as between the Devon, Aberdeen Angus and Shorthorn, inasmuch as the dams of the various bullocks were not all of the same breed. One point, however, impressed upon us is the fact that the ordinary unimproved native bullock is not worth bothering with for beef production. The business demands a more or less improved beast. The Mashonas were included in the experiment for the purpose of ascertaining this point. For all other purposes it will help little to include them in our consideration of results, and each lot, therefore, will be considered as containing six bullocks only.

System of Feeding.—We find under the full feed system that Lot 1 made an average gain of 224.3 lbs. per bullock. Under the feed and grazing system, Lot 2 gained 152.5 lbs. per beast, and under a purely grazing system, Lot 3 made only 45.6 lbs. per beast.

The prices actually realised for these beasts are of no value to us whatever in our considerations. For various reasons, there was a complete absence of competition, and in any case most of the buyers, being unaccustomed to heavily stall-fed beasts, much underestimated the weights. Let us, therefore, take as a basis a market for good beef at 35s. per 100 lbs., which is rather below than above the local average price. We can then tabulate the result as follows:—

TABLE V.

Shewing Profit at 35s. per 100 lbs.

Lot.	Average Gain in Dead Weight, per Beast.	Value of Gain at 35s. per 100 lbs.	Cost of Feeding, per Beast.	Net Profit per Beast on the Farm.	Cost of Getting to Market, per Beast.
	lbs.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1	224·3	3 18 6	3 4 1	0 14 5	0 5 0
2	152·5	2 13 0	2 8 5	0 4 7	0 5 0
3	45·6	0 15 10	0 5 0 (maintenance)	0 10 10	0 5 0

TABLE VI.

Shewing Profit at 40s. per 100 lbs.

Lot.	Average Gain in Dead Weight, per Beast.	Value of Gain at 40s. per 100 lbs.	Cost of Feeding, per Beast.	Net Profit per Beast on the Farm.	Cost of Getting to Market, per Beast.
	lbs.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1	224·3	4 9 9	3 4 1	1 5 8	0 5 0
2	152·5	3 1 0	2 8 5	0 11 7	0 5 0
3	45·6	0 18 3	0 5 0 (maintenance)	0 13 3	0 5 0

Until we look further into the matter, the half feeding half grazing system stands condemned. It must be remembered, however, that the experiment started in June, and that, until the end of September or October, the grazing in the Mazoe district is not by any means at its best. It was found that until the spring grass made its appearance there was little

to be gained by running Lot 2 during the day time. They certainly consumed less in the stalls, but most of them made less weight. Again, for the same reasons, Lot 3 did not weigh nearly as much in September as at the beginning of the experiment, and had therefore a considerable amount of lee-way to make up when the grass came. The writer watched the cattle very closely during the whole course of the experiment, and the impression left on his mind is that from the time the grass is good in the spring until, say, May, it is quite possible that a system of mixed feeding and grazing may be found very profitable, especially if an intelligent variation of the ration be made in order to compensate for the grass, in accordance with whether it is rank and green or getting dry. From May to October (speaking of the Mazoe and Gwebi districts only) total confinement to the stall or yard is indicated as the most profitable method.

Duration of Feeding Period.—Although in the case of Lot 1 there were no signs at any time of the cattle going off their feed, it is probable that the actual gains made during the last month were much less than in the early stages of the experiment, and it has been decided, should opportunities occur for further investigation under this head, that the beasts will be yarded, say, early in May, and an attempt made to market them in prime condition, say in late September or October, thus feeding for five months instead of six-and-a-half months. The writer is of opinion that this may be successfully accomplished and that the prices thus realised will probably exceed those made at Christmas time as a rule.

Manurial Value of Feed Lots.—This is a very important factor, and must on no account be lost sight of. In the present instance no cash account has been taken of it, and it has merely been placed against labour, which it much more than covers. With proper management each beast will produce and tread in, say, two tons of manure, worth 15s. per ton.

The Running of Pigs behind Stalled or Yarded Cattle.—For some part of the time two pigs were run in the yard behind eight bullocks. There being no means of weighing them at the moment, no attempt was made to calculate the

actual result, but from personal observation the writer is of opinion that, where crushed mealies are fed in limited quantities, there is not a great deal left over for the pig, and he will require some food in addition. There is no doubt though that the pig in any case entirely eliminates waste, that the cattle yard is a convenient place to run him, and that by rooting about he helps to improve the quality of the manure.

General Methods of Feeding and Foods Used.—A great deal depends on the method employed in feeding cattle, and daily intelligent observation of the appetite of the beast under his care is required by the feeder, if the best results are to be obtained. Too much importance cannot be attached to cleanliness, punctuality, orderliness and the habit of always moving quietly amongst the beasts. If entire stall feeding is to be adopted, there are two principal ways of carrying it out, namely, by tying the bullocks up for the whole period in sheds, and by running them at large in yards just big enough to allow them to move about moderately. Tying up for the whole period undoubtedly tends to make the beast quiet, it prevents the bullying of the weaker by the stronger, and ensures each beast getting his fair share of the food. For these reasons, probably the best actual gains in weight may be made by its adoption. On the other hand, one must remember that the housing accommodation for tied-up beasts is not always of the best; that the labour of cleaning out the stalls, etc., is increased when beasts are tied up; that our native labour is often indifferent and expensive, and that in most cases cattle have a long way to go to market eventually in warm weather. The writer is of opinion that for the present (except perhaps in the case of bullocks preparing for show) the system most suited to the average farmer's circumstances is that of putting the cattle loose into small yards, with some lean-to shelter and efficient manger accommodation; always using one's judgment in not putting a big bullying beast in with small ones, and so forth, so that each lot may live peacefully together. The yard will require no cleaning out whatever, but the bedding, in the shape of grass, straw, old mealie stalks and so forth, must be replenished as often as the top surface appears trodden in or wet. The manure is only removed after the beasts have been disposed of. Proper attention to the

bedding is most essential, both for the comfort of the beasts and the making of valuable manure.

One cannot lay down any hard and fast rule as to how beasts are to be fed, but, generally speaking, the following system will be found convenient:—

6 a.m.—Rather more than one-third of the grain ration, mixed with one-third of the mangels, ensilage or other succulence, and perhaps a little chaffed hay.

8 a.m.—One-third of the hay or roughage.

10 a.m.—Replenish bedding if necessary, and leave cattle undisturbed till 12.30.

12.30 p.m.—Some of the grain and one-third of the succulence and chaff, to be followed by a little better class hay of some kind, after which the cattle should not be disturbed till, say, 4.30.

4.30 p.m.—Feed the same as in the morning.

Sundown.—Rack up with plenty of hay or stover.

8.30 p.m.—Look round cattle and see that there is plenty of hay in the racks.

One often hears the complaint from farmers who have attempted to stall feed cattle that they cannot get them on to their feed. The matter is one which demands merely a little patience and common sense. On putting up bullocks from the veld, for instance, into a yard, one would not expect them to get on to full feed for a month or more. It will generally be found that they will eat hay in some form first; the hay may be sprinkled with brine, and gradually a little meal of some sort may be added to it. Never leave an unfinished ration in the manger more than a couple of hours or so, and lessen it continually until it is finished up clean, from which time it may be gradually increased again until the bullocks are on full feed. It is much easier to get a number of cattle on feed than an individual, because usually one of them will begin eating and the others soon follow suit.

The feed given to the bullocks which have been made the subject of the experiment was usually prepared as follows:

A clean floor having been selected in the feed house, the ration of chaff or broken hay for the day was just spread out in a layer about 3 or 4 inches thick. This was then well sprinkled with brine water. If mangels or pumpkins were being used, these were put through the machine and spread on top of the hay. Next the ration of green, and the whole was then well mixed together and left in a heap with some old bags over it until required for use 24 hours later. By this method the rougher chaff and hay became softened, and the grain adheres to it, making it a soft and palatable feed. If ensilage was used, it was omitted from the mixture, and added only when put into the manger. The roughage and some of the better hay was fed in dry bulk, being placed in the mangers when the soft feed had been cleared up. Tables of the daily ration used in the case of Lots 1 and 2 will probably convey a better idea to the reader of the amounts of food required than any lengthy description of the same.

TABLE VII. Lot 1.—Daily Rations used per Beast.

Month.	Crushed Mealies.	Velvet Bean Hay.	Teff Grass Hay.	Veld Hay.	Oat Straw.	Pumpkins or Majordas.	Mangels.	Ensilage.	Buckwheat.	Bean Meal.	Total Grain.	Total Succulence.	Total Roughage.	Daily Cost per Beast.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	Pence.
June	4·0	1·7		2·5	...	...	5·6	...	0·5	...	4·5	5·6	4·2	2·4
July	10·3	5·8	...	5·4	...	...	15·5	...	...	...	10·3	15·5	10·9	4·0
August	10·4	7·1	...	9·6	...	15·4			...	...	10·4	15·4	16·7	4·2
September	10·0	5·8	...	12·0	...	6·6	2·6	6·0	...	...	10·0	15·2	17·8	3·8
October	10·0	5·9	...	12·0	...	11·6		6·8	...	...	10·0	18·4	17·9	4·1
November	10·0	3·7	0·4	12·0	...	...	10·7	8·2	...	0·9	10·9	18·9	16·1	4·6
December 1-15 ...	10·0	...	1·5	12·0	...	...	3·1	8·0	...	2·0	12·0	11·1	13·5	4·4

Lot 2.—Daily Rations used per Beast in addition to Grazing.

June	3·9	1·3	...	2·3	...	...	4·3	...	...	1·4	5·3	4·3	3·6	2·0
July	8·2	4·9	...	3·4		...	13·7	...	...	...	8·2	13·7	8·3	3·2
August	8·4	5·7	...	5·1	...	1·7	11·7	0·7	...	...	8·4	14·1	10·8	3·1
September	8·0	4·8	...	6·4	...	6·6	2·5	4·0	...	...	8·0	13·1	11·2	2·9
October	8·0	4·6	...	6·0	...	4·2	6·1	4·5	...	...	8·0	14·8	10·6	2·5
November	8·0	3·3	0·3	6·0	...	...	10·7	6·2	...	0·9	8·9	16·9	9·6	3·7
December 1-13 ...	8·5	...	1·7	6·0	...	1·2	1·9	8·0	...	2·6	11·1	11·1	7·7	3·9

It had been intended to use ground nuts during the later periods, and indeed some such feed as this was needed, and would have materially improved the finish of the bullocks. Unfortunately the whole supply of ground nuts on the Gwebi farm were required for seed, and one had to do the best one could without them. It may be mentioned here that a fairly heavy ration of some oily feed at the commencement of the fattening period will generally be found useful in loosening the skin and generally toning up the system.

Cost of Production of Foodstuffs.—The cost of production on the Gwebi farm of the various foodstuffs used on which the calculations in this article are based is as follows:—

Maize, 3s. 6d. per 200 lbs.
Velvet bean hay, 12s. per ton.
Teff hay, 12s. 6d. per ton.
Veld hay, 7s. 6d. per ton.
Pumpkins and majordas, 5s. per ton.
Mangels, 12s. per ton.
Maize ensilage, 10s. per ton.
Bean meal, 7s. per 200 lbs.

Comparison of Profit from Direct Sale as Compared to that Derived by Feeding Foodstuffs to Bullocks.—Does it pay better to feed to cattle or to sell the food direct? In all cattle countries this is a question which presents itself regularly, and has to be seriously considered before feeding operations are commenced or a choice of feeds is made. In the present case we find, for instance, that Lot 1 consumed 10,930 lbs. of maize. Assuming that the average sale price in Salisbury of maize during the period between June and December, 1915, was 7s. 6d. per bag, we are enabled to make the following calculation:—

	£	s.	d.	£	s.	d.
10,930 lbs. of maize at 7s. 6d. per 200 lbs.				20	9	10
Cost of production at 3s. 6d. per 200 lbs.	9	10	1			
Cost of bags at 1s.	2	15	0			
Hauling to station, say	0	10	0			
Railage to Salisbury at 5s. 8d. per ton ...	1	11	4			
				14	6	5
Net profit				£6	3	5

Turning to Table V., we find that each bullock returned a profit of 16s. 11d. when sold at 35s. per 100 lbs. Six times this amounts to £5 1s. 6d. Taking into consideration, therefore, the maize only, it would have paid better to sell it direct; but in addition to maize, some of the other feeds used might have been sold at a profit, so that in this particular instance the feeding of bullocks was not a business proposition.

The reader must not condemn bullock feeding as unworthy of consideration on this account. Let him remember that if more than a few farmers were to grow teff hay, velvet bean hay, mangels, and so forth, these feeds would be a glut on the market, and any hope of selling them at a profit would be at an end, unless he fed them to stock. Similarly, the actual profit realised by selling maize as grain varies from time to time, and with distance from the rail, and it may often fall to a point when it will pay at least as well to feed to bullocks as to sell as grain, and by thus feeding it will enable the farmer to market many crops, otherwise unmarketable, in conjunction with it. Then again, one must not forget the important point of the production of manure, which on a large scale will much more than pay for the labour, and will leave an additional profit to the credit of the bullocks fed. Again, the bullocks may in many cases have been bred by the feeder, in which case they may be put into the feeding venture at a lower figure than those bought elsewhere, since the grazier's profit is eliminated.

I would point out that in considering this subject I have taken no account of rent of land or payment for the owner's supervision, because although these things should, strictly speaking, be taken into account, the position in most cases is that the farmer has the land, he has to live on it and do something with it, and any method of producing something which he can sell is better than doing nothing.

Sale for Beef.—Finally, the writer will answer the inevitable question, "What is the use of feeding cattle when there is no sale for them?" None whatever. But it is more probable that a regular and adequate market will be found for a good class of beef than for hays, fodders and foodstuffs as such, and the investigations which have been made into the feeding of beef cattle, and which it is hoped will be continued,

are with a view to encouraging individual and private thought on the subject, and helping the farmer to be prepared when the market for beef is established. While seeking a market for our beef, it is important that we should realise what we are marketing. In almost all cases stall-fed cattle give a much greater percentage of carcase to live weight than do grass-fed animals, and the value of the inside fat is especially greater in the former.

The writer recently had an opportunity of witnessing the killing and weighing of three cross-bred stall-fed animals. Two of them shewed a good deal of Shorthorn in their composition, and one was sired by an imported Sussex bull. All were between five and seven years old. The returns were as follows :—

TABLE VIII.

	No. 1 Shorthorn.	No. 2 Shorthorn.	Half-bred Sussex.
Live weight	1,645 lbs.	1,845 lbs.	1,370 lbs.
Dressed dead weight ...	957 lbs.	1,147 lbs.	798 lbs.
Percentage of carcase to live weight	58·17	62·1	58·2
Saleable fat and offal ...	215 lbs.	165 lbs.	212 lbs.
Total saleable meat ...	1,172 lbs.	1,312 lbs.	1,010 lbs.

Roughly speaking, the butcher to-day reckons to pay about £1 per 100 lbs live weight for a beast. One would, therefore, we may presume, receive an offer of £48 10s. for the above three beasts, or, let us say, £50. Now, there is a larger proportion of first-class and more valuable meat, as compared to cheap meat, on a properly stall-fed bullock than there is on a grass-fed one, and it is probable that much more than half of the carcase sells at the higher price. To be on the safe side, however, we will take half the carcase as being retailed at 1s. per lb. and half at 6d. per lb. The offal of the three beasts, which in-

cluded a large amount of valuable fat, the tongue, tripe, tail, head, liver, etc., 592 lbs., was easily saleable at an average price of 4d. per lb. We then have a return for the three beasts as follows :—

TABLE IX.

1,451 lbs. of best meat, at 1s. per lb.	£72	11	0
1,451 lbs. of inferior meat, at 6d. per lb.	36	5	6
592 lbs. of offal, at 4d. per lb.	9	17	4
Three hides at, say, £1	3	0	0
	£121	13	10

which represents a gross profit of £143 7s. 6d. per cent.

It would appear, therefore, that at the present retail rates the butcher may provide for trade expenses, bad debts, loss on having to cut uneconomically to suit small customers, and for meat going bad on his hands, and still allow the grower considerably more profit out of the beast than he is getting now.

Statistical Returns of Crops in Southern Rhodesia

FOR THE SEASON 1914-15.

By Eric A. Nobbs, Ph.D., B.Sc., Director of Agriculture, and B. Haslewood, F.S.S., Statistician.

The returns compiled for last year's crops are full of interest and instruction, and furnish particulars never previously available, except as regards maize and tobacco in 1913-14.

The conscientious care and the warm interest shewn by those furnishing the individual returns, from which the general figures are derived, is a specially satisfactory feature. There has been no difficulty in obtaining returns: on the contrary, persons overlooked or unknown have not been slow to ask for forms to fill in, and it is believed that practically every farmer in the country now furnishes the particulars called for. This is a most gratifying feature, as the accuracy of the tabulated statistics is of course dependent on the care shewn in filling in the individual returns and on the fact that no one is omitted. There is every evidence in the returns sent of the earnest endeavour on the part of the farmers to give accurate figures, and the totals arrived at are strictly based upon those received. The responsibility for any incompleteness in the final tabulation must, therefore, rest with individual members of the farming community. In this connection it is to be remembered that acreages are seldom accurately measured, but only estimated, or at best stepped out. The numbers of bags are, however, not difficult to ascertain, and in converting these into measures of weight, the standard weights customary on the markets have been adopted. In the compilation of

these returns accuracy has been aimed at even at the cost of some delay for enquiry into doubtful points or omissions, for reminders to be sent to those whose returns had not been received and for like causes. At the same time it is realised that statistics of this nature lose a good deal of their immediate general interest by delay in publication, even though their value as a permanent record for comparison and guidance in years to come is not impaired. In considering the figures published in the accompanying tables, it is to be remembered that they refer entirely to European grown crops. Native grown crops will be dealt with separately and at a later date, when the returns furnished by the Native Department become available.

As regards the European farming population of Rhodesia, it is noteworthy that a number are away on active service, and that their farms are occupied by substitutes or worked by neighbours, and in some cases have been temporarily abandoned. The magnitude of the figures here published will come as a surprise to many conversant with the conditions under which last season's crops were grown. No doubt the yields would all have been considerably larger but for the excessive rains, which militated against full crops almost everywhere, and in some districts diminished the returns by about one-half. In this connection it is apparent that the sand veld districts suffered rather more than the red soil areas, and the losses were particularly great in the mopani veld in the Matobo district, in Marandellas, Selukwe, and to the east of Gwelo. Apart from the rains, reports of injury have been few, chiefly due to baboons and buck, whilst small birds did an enormous amount of mischief to the kaffir corn crops everywhere, and to quite an exceptional extent.

In perusing the accompanying notes it should be borne in mind that the average figures for the whole country or large districts always appear much lower than what is generally regarded as a fair crop by those growing it, as such averages take full notice of all failures, complete or partial, whatever cause they may be due to, including crops grown on unsuitable ground, or sown too late, or injured by flood, drought, or neglect, or damaged by animal or insect pests, or any other cause. This is particularly the case with universally grown

crops, such as maize, ground nuts and tobacco, which are often planted in unsuitable soils or situations, the consequent failures tending to lower the average figure for the whole country. As experience shews which crops are best suited for particular areas, no doubt they will be more restricted to their proper belts. In any case it is an accepted axiom that averages taken over a whole district or country invariably work out at considerably less than would be expected as a fair average crop in the case of an individual farmer. The official statistics of the United States of America and the returns of the Board of Agriculture for Great Britain bear out this view.

TOTAL ACREAGE OF LEADING CROPS.

The total acreage under the principal crops grown by European farmers in the season 1914-15 amounted to the very substantial figure of 183,407 acres. Of this total 142,950½ acres were cultivated in Mashonaland, and 40,456½ acres in Matabeleland. This may be regarded as a fair measure of the relative importance of arable farming in the two Provinces; Matabeleland ranking, of course, mainly as a pastoral country; whereas in Mashonaland both arable and pastoral farming are pursued.

Table No. 1, appended, shews the extent of ground under cultivation in the 31 native districts into which Rhodesia is sub-divided. The place of honour is held by Mazoe, with 41,524 acres, with Salisbury a good second—34,745, and Hartley third—21,641. Of the total, it is interesting to observe that 167,012 acres, or 91.06 per cent. of the whole, is devoted to maize, the next more important crops being represented by the following acreages and percentages of the whole:—Kaffir corn 2,352½ acres, or 1.28 per cent.; hay and forage crops 2,241¼ acres, or 1.22 per cent.; ground nuts 1,523 acres, or 0.83 per cent.; and tobacco 1,369½ acres, or 0.74 per cent.; while winter wheat runs the last-named very close with 1,364 acres, and practically the same percentage.

MAIZE.

The statistics regarding maize are those which will elicit most interest, and therefore require most careful analysis.

The returns for 1914-15, as shewn in Table No. 2, give a total area of 167,012 acres, and a total crop of 914,926 bags, a satisfactory amount considering the somewhat abnormal season and the economic position of the country at present. With the native grown crop, returns of which are not yet available, the total maize grown in Rhodesia last year must be well over a million bags. The more important figures have been taken out of the general return and placed in Table No. 2, and from these it will be noticed that the average return for the whole country is 5.47 bags per acre, that for the "mealie belt" being 7.61 bags, or 1,523 lbs. per acre. Mazoe district yields the high average of 9.01 bags, or 1,802 lbs. per acre. There are many individual farmers whose average is reliably known to be from 12 to 18 bags; particularly good pieces of land run into much larger figures. The average figure for the whole of Rhodesia is possibly lower than many would expect. The figure for the maize-growing section of the country, 7.61 bags, is perhaps a fairer criterion of what the *arable* farmer may reasonably expect and base his estimates upon.

Comparing the yield of 1914-15 with that of 1913-14, we find that the total acreage under maize has actually increased by 5,744 acres, or 3.56 per cent. of the total; and this notwithstanding a decrease of 13,387 acres in Matabeleland. The average yield for the whole country has also increased from 3.93 bags to 5.47 bags per acre, a truly noteworthy increment for a figure of this nature, and one which would have been even greater but for the unfortunate climatic conditions in some districts. The total yield for the whole country increased at the same time by 280,793 bags, no less than 44.28 per cent. This increase in area and yield has specially taken place in the districts where maize has shewn itself to be most successful, and in this belt the average has been brought up from 5.21 bags to 7.61 bags per acre. These figures shew a distinct tendency towards the concentration of the maize growing industry within certain districts, with a correspondingly diminished cultivation in areas where the crop yields a light return, thus indicating a natural and judicious specialisation according to the needs and conditions of different parts of the country.

At the beginning of last season estimates were called for

from the farmers at a time when the acreage planted and the earlier weather conditions were known, but whilst it was still impossible definitely to foresee what the crop would be or to forecast the weather conditions prior to harvest. These estimates are shewn in Table No. 3, in a column parallel with the actual results, and a comparison between the two is of no little interest, especially to the farmers living in the districts. The total estimate was 1,006,624 bags, and the crop reaped 914,926 bags, so that the yield was 9.1 per cent. short of what had been expected at the commencement of the season. In certain districts the estimate was very close to the actual crops realised, and it is apparent that where the disparity is greatest, the error was due mainly to the excessive rainfall. It will be seen that the crop was most disappointing in the districts of Marandellas, Matobo, Selukwe and Gwelo, where it only reached about half of the forecast, whilst in Bulalima-Mangwe it amounted to about two-thirds of what was at one time hoped for. Of the leading maize districts, Mazoe reaped 4.1 per cent., and Lomagundi 13.9 per cent. more than was anticipated, whilst Salisbury harvested 12.3 per cent. and Hartley 11.7 per cent. less than was hoped for. Estimates of the forthcoming harvest are always of the utmost importance to buyers and sellers alike. It will no doubt take many years for the farmers to educate themselves up to a fine pitch of accuracy in their estimates, whilst the accidents of climate must always exert a considerable influence, and allowances must be made for the weather experienced between the time the estimates are formulated and the date of harvest. With the round figures of such estimates as a first approximation, however, and by careful observation of subsequent climatic events, we should be in a position to make a fair estimate of what quantities are likely to be available some time before the crop is on the market.

In connection with our maize, it is always to be remembered that the intrinsic quality of the grain is exceedingly high. It is to be regretted that as yet in the world's market no distinction is made between the maize of Rhodesia and that of the Union of South Africa, if the considerable superiority claimed for our maize is justified. Whilst our total quantity exported, however, remains so small, this is perhaps hardly to be expected. It is also to be remembered that our standard of

grading is itself based upon the same definitions as are applied to the maize of the South.

The quantity of maize exported last season from Southern Rhodesia amounted to 326,353 bags, a market being found for this mainly in England, but also in Australia. Against this we have to set a small importation. The returns issued by the Customs Union Statistical Bureau record importations of maize for the first ten months of 1915—the returns for the last two months being not yet to hand—of 2,966,259 lbs., or 14,831 bags of maize, a considerable increase on the corresponding figure for the same period of the previous year. These imports appear to have come from districts close to our own borders, more favourably suited geographically to certain centres of consumption than are the maize growing areas of Southern Rhodesia. Thus we find that maize has been conveyed from Northern Rhodesia to Wankie, from the Tati Concessions to Bulawayo, and also in small quantities across the Limpopo River from Messina, and from across the Zambesi River near Feira.

In addition to the above, maize meal has also been imported during the same ten months equivalent to 1,594 bags of maize; from which it will be observed that there is a total importation of 16,425 bags in ten months to be balanced against our exportation, which should be deducted from the total quantity of our exports. The actual balance of trade can only be determined when the importations for November and December are to hand.

TOBACCO.

As compared with the previous season, the production of tobacco in Southern Rhodesia last year shews a very heavy drop from over three million pounds to under half a million pounds, and from 5,627 acres to 1,369½ acres. This crop is mainly grown in certain districts, and the fall in each of these deserves to be particularly noted. In Marandellas the diminution of cultivation has been from 2,074 to 598 acres: in Salisbury from 766 to 189 acres; in Hartley from 571 to 202 acres: and in Mazoe from 1,106 to 28 acres; this last extraordinary drop being chiefly owing to one large producer ceasing to plant tobacco altogether. In the coming year the probability is that

the acreage will not be less than last year, and possibly considerably more. Not only was the acreage less, but the average acre yield was reduced from 544.11 lbs. in 1913-14 to 309.71 lbs. in 1914-15. This is probably accounted for not only by the unfortunate season, but also by a more stringent discarding of inferior leaf by the farmers, who formerly used to cure and send to the warehouse practically every ounce grown on their land. Combined results of diminished acreage and reduced yield led to the phenomenal drop recorded above.

The reduced acreages have already been given, and the reduced quantities produced in 1915, as compared to 1914, may be stated in detail as follows:—

	1915. lbs.	1914. lbs.
Mazoe	11,000	927,966
Marandellas	159,763	847,348
Salisbury	68,835	334,918
Hartley	80,800	188,227

As is known to all tobacco growers, certain of the difficulties militating against this crop have recently been, it is hoped, permanently overcome and the industry placed on a new and more satisfactory basis, so that a revival of effort in this direction may be confidently looked for.

A comparison between the estimates given at the beginning of the season and the actual harvest shews great disparity, and it is apparent that the season disappointed many hopes. It is notable, however, that tobacco growers appeared to have a very general misconception of the normal yield to be obtained from an acre; the total expectation being 50 per cent. over the actual return.

POTATOES.

Potatoes are grown both as a summer crop, and as a winter crop under irrigation, and the returns shew that approximately twice as much is grown in the summer season as in the winter, but that the heavier yields are obtained from the latter; the irrigated land usually being richer than that on which the summer crop is cultivated. The high returns for this crop all over the country are a noteworthy and encouraging feature.

Particulars will be found in Table No. 4. The average return of summer-grown potatoes is no less than 23.57 bags, or 3,536 lbs. per acre for the whole of Rhodesia, and 28.18 bags, or 4,227 lbs. per acre for the winter crop. In the districts where potatoes are most largely grown the averages are even higher; thus Salisbury for summer potatoes averages nearly 31, and for winter-grown potatoes nearly 32 bags to the acre. A particularly noteworthy example comes from a producer in the Selukwe district, who in summer grew 250 bags on 3½ acres, and in winter no less than 1,000 bags on 12 acres of ground, irrigated. Our difficulty, of course, in connection with potatoes is that of keeping them after they have ripened; and as a natural consequence prices fluctuate considerably, rendering the crop a speculative one, but at the same time enhancing the value of potatoes grown between seasons.

Our total crop available for consumption both summer and winter amounted to 30,196 bags. Importations of potatoes for the first ten months of 1915, for which period only Customs returns are as yet available, amounted to 4,038 bags, valued at £2,608 for Customs purposes, of which three-quarters came from other parts of the South African Customs Union, and the remainder probably almost entirely from Portuguese East Africa. These figures of imports are practically the same as those for the corresponding period of the previous year (£2,699), and shew that as yet we do not fully meet the requirements of the country in regard to this article, nor have we even effected a reduction in the trade from beyond our borders.

GROUND NUTS.

It is obvious that this crop is mostly grown on the sandier soils; yet the much higher average yield per acre from districts where heavier soils predominate points to the possibility of its profitable cultivation even where cost of production per acre may be higher, and proves that the general impression that this is a crop only for the sand veld is erroneous. It should be remembered, however, in this connection that it was the sand-veld crops last year that suffered most from the heavy rains. Apart from the excellent outlet offered for this commodity by the mines, the oil factory affords a market not hitherto available, and there is good reason to think that this

industry may grow ere long to very considerable dimensions. The possibilities of export of ground nuts to Europe, where the oil is in great demand, are at present being investigated: and trial shipments have been sent Home for the purpose of testing the market in a practical way; there being some uncertainty, which a mere consideration of figures does not dispel, as to whether we are in a position to compete against the native grown produce from the east and west coasts of Africa. The position of this crop in the country is best shewn by the accompanying tabulated Statement No. 5, from which it will be seen that the average from the whole country was 6.87 bags, or 550 lbs. per acre, the Mazoe district, however, holding the palm with the much higher average of 10.18 bags, or 814 lbs. per acre.

SUNFLOWER.

An industry that, though but a minor one as yet, is rapidly growing, is the cultivation of sunflower, not only with a view to oil for the factory, but also for poultry and for feeding to stock on the farm. It is already grown in most districts in small quantities, and a considerable increase in this commodity may be looked for in the near future. The black seeded variety is generally to be preferred to the striped one. Only 424 acres are recorded, of which Mashonaland claims 367½ acres, and Matabeleland 56½; while in the Mazoe district alone there were 132 acres, with an average yield of 803.1 lbs. per acre. For the whole Territory the return was 580.6 lbs. per acre.

Reference to the general tabulated statistical return will indicate the precise position of this crop in the various districts.

CITRUS FRUITS.

For some time past the possibilities in regard to the export of oranges from this country have been recognised, and the figures shewn in Table No. 6 indicate the present position of this promising industry. It would appear that for oranges the first position is occupied by Mazoe, and from the number of trees recorded as not yet in bearing it is obvious that this district is likely to retain its lead for the next few years. Similarly, too, there are prospects of considerably increased production

in Umtali and some other districts. From the number of trees now in bearing and coming into the profitable stage, and from the success which has attended experimental exportations during the past season, it is obvious that export on a commercial scale is now both feasible and within sight. It is also apparent that there are more than enough oranges in the country to meet local requirements if only the trade were properly organised, and that therefore there is no occasion for the importation which takes place from outside the Territory, except perhaps during the off-season. Even this element in the situation can be eliminated if late varieties are planted on a larger scale than is the case to-day. With nearly 25,000 orange trees and about 10,000 other citrus trees already in bearing, there is more than one tree per head of the white population, which should surely be enough to meet local needs and leave something over.

WHEAT.

Wheat is grown in Rhodesia both as a summer and a winter crop, but mostly the latter, as is seen on reference to the tables. The total acreage is inconsiderable, and the crop is still mainly grown in remote districts such as Melsetter and Makoni, to which the transport of meal is a costly operation. Wheat is also grown to a considerable extent experimentally. Last season rust was particularly prevalent owing to the excessive damp, otherwise no doubt the returns would have been much larger than 18,717 bushels, which is all that they amount to in all.

KAFFIR CORN.

Kaffir corn appears to be increasingly grown by Europeans, and, as the statistics shew, mainly in Matabeleland; although again the heavier acreage returns come from Mashonaland. In some districts the crop is hardly grown at all. The return last year was exceedingly light owing to the heavy rains and the quite unusual ravages by small birds, which were reported everywhere in most inexplicable numbers, often completely ruining the crop. The total acreage for the Territory was only 2,352½ acres, and the average yield less than 2 bags, or 362 lbs. per acre. The average return for Mashonaland was 2.7 bags, and for Matabeleland 1.47 bags per

acre; but these figures must not by any means be taken as a fair indication of the quantity usually harvested in this country.

FORAGE CROPS.

A number of different crops of small acreage are included together under this heading, such as lucerne, teff, oats, barley, Boer manna and other millets, Napier's fodder, cow-peas and velvet beans, which collectively make a not inconsiderable factor, and which are evidently rapidly increasing in popular favour, not only on account of the direct use they serve, but also for their value as introducing a change of crop in place of maize, in which capacity they offer a considerable advantage over the alternative of bare fallow. The returns, since they cover a number of varieties, are of too general a nature to be a very definite guide as to any particular forage crop.

SUNDRY OTHER CROPS.

Under this category are included linseed, buckwheat, peas, beans, dhal, castor oil and artificial pasturage. Though still more or less in the experimental stage, these crops are rapidly growing in public favour. Collectively at present they only extend to 1,127 acres, which is a small part indeed of the total area under crops in this country, but none the less well worthy of consideration as representing the small beginnings from which greater things are to be expected.

Owing to the amount of voluntary information tendered and the evident desire to give information on the subject, it is proposed next year to provide separate spaces on the returns, in addition to those already enumerated, for the following crops:—Veld hay, Napier's fodder, dhal, pumpkins and kaffir melons, sweet potatoes and onions, all of which appear to merit this consideration.

ENSILAGE.

Whereas a few years ago the use of ensilage was hardly known, it is a most satisfactory feature to note that in every district except the most outlying and backward, such as Sebungwe, Wankie, Belingwe, Matobo and Chilimanzi, and on the extreme eastern border, Inyanga and Melsetter, where

the climatic conditions and irrigation possibilities render the cultivation of succulent food for winter unnecessary, we now find ensilage in general use.

The crops grown for the purpose include maize, Napier's fodder, grass, velvet beans, cow-peas, kaffir corn, buckwheat, sunflower and the tops of ground nuts. Owing to the difficulty of differentiating between what is specifically grown for silage and what, though possibly originally intended for other purposes, is eventually diverted to silage use, it is exceedingly difficult to say what acreage is represented, but it may be stated, approximately, as about 3,000 acres, equally divided between Matabeleland and Mashonaland; and the quantity of food made into ensilage is somewhere in the region of 10,000 tons.

From experience gained in compiling these returns, it would seem advantageous rather to ask in future years for number and size of silos than for acreage and weights of silage.

IRRIGATION.

The returns asked for in connection with irrigation are somewhat complex, and have been made up from a large number of small returns. It is apparent that irrigation in Southern Rhodesia is developing, not in the direction of large schemes or individual irrigation farms, but rather through numerous small acreages; every farmer trying to have a patch of green food for winter, grown with the help of artificially stored water. The principal irrigation districts at the present time are Mazoe, Salisbury, Umtali and Melsetter. Of a total of 5,445 acres under irrigation, 4,842½ are recorded from Mashonaland, and 602½ from Matabeleland. Of this total, by far the greater proportion, viz., 4,838 acres, was irrigated from rivers or small streams, 4,402½ acres by gravitation, the other 435½ acres requiring the assistance of pumps on the banks; further 429½ acres were provided for by means of storage dams, while the remaining 177½ acres derived their water from wells or other subterranean sources.

No. 1.—DISTRICTS IN ORDER OF ACREAGE UNDER PRINCIPAL CROPS.

District.	Number of Acres.	District.	Number of Acres.
1. Mazoe ...	41,524	16. Victoria ...	2,711¼
2. Salisbury ...	34,745	17. Chilimanzi ...	2 630½
3. Hartley ...	21,641	18. Bulawayo ...	2,095½
4. Lomagundi ...	12,869	19. Darwin, Mrewa and Mtoko ...	1,918
5. Gwelo ...	8,656	20. Melsetter ...	1,894
6. Marandellas ...	7,141	21. Gwanda ...	1,560½
7. Selukwe ...	6,370½	22. Gutu, Ndanga and Chibi ...	1,537
8. Makoni ...	5,600	23. Wankie and Sebungwe	1,052½
9. Insiza ...	4,932½	24. Matobo ...	938¾
10. Umtali ...	4,852	25. Belingwe ...	596¾
11. Umzingwane ...	3,929	26. Inyanga ...	286¼
12. Bulalima-Mangwe	3,838		
13. Charter ...	3,601½		
14. Nyamandhlovu ...	3,490½		
15. Bubi ...	2,996		

Note.—Above districts are numbered 1 to 26, but three of the numbers include more than one district. The total number of districts is 31, as in the text.

Total for Mashonaland	...	142,950½ acres.
Total for Matabeleland	...	40,456½ acres.
Total for Southern Rhodesia	...	183,407 acres.

No. 2.—MAIZE, 1913-14.

	Acres.	Bags.	Average Return per Acre.	
			Bags.	lbs.
Southern Rhodesia	161,268	634,133	3·93	786
Mashonaland ...	112,882	541,219	4·79	959
Matabeleland ...	48,386	92,914	1·92	384
Mazoe ...	28,759	193,598	6·73	1,346
Salisbury ...	31,009	160,296	5·17	1,034
Lomagundi ...	8,574	32,050	3·73	747

MAIZE, 1914-15.

	Acres.	Bags.	Average Return per Acre.	
			Bags.	lbs.
Southern Rhodesia	167,012	914,926	5·47	1,095
Mashonaland ...	132,023	819,841	6·21	1,242
Matabeleland ...	34,989	95,085	2·71	543
Mazoe ...	40,149	361,865	9·01	1,802
Salisbury ...	32,410	220,327	6·79	1,359
Lomagundi ...	12,429	65,241	5·25	1,050

No. 3.—SOUTHERN RHODESIA, 1914-15.

Districts.	Maize Yield.	
	Estimated, Bags.	Actual, Bags.
Mashonaland:		
Salisbury	251,351	220,327
Mazoe	347,504	361,865
Lomagundi	57,233	65,241
Darwin, Mrewa and Mtoko	7,816	5,381
Hartley	83,916	74,088
Marandellas	24,388	13,764
Umtali	30,492	26,577
Melsetter	9,950	6,558
Makoni	27,983	20,503
Inyanga	1,073	1,032
Charter	8,415	7,686
Chilimanzi	7,615	4,221
Victoria	11,041	8,963
Gutu, Ndanga and Chibi ...	4,865	3,635
Total—Mashonaland ...	873,642	819,841
Matabeleland:		
Bulawayo	5,850	5,654
Umzingwane	8,651	8,590
Matobo	4,441	2,104
Bulalima-Mangwe ...	9,543	6,309
Nyamandhlovu	7,810	6,943
Bubi	13,788	11,005
Insiza	14,580	13,247
Gwelo	29,521	16,854
Selukwe	29,094	16,215
Belingwe	1,820	1,648
Gwanda	3,264	3,408
Wankie and Sebungwe ...	4,620	3,108
Total—Matabeleland ...	132,982	95,085
Total—Southern Rhodesia	1,006,624	914,926

No. 4.—POTATOES.

Summer Crop.

	Acres.	Bags of 153 lbs.	Average Return per Acre.	
			lbs.	Bags.
Southern Rhodesia	1,079	24,536	3,536	23·57
Mashonaland ...	856	20,726	3,632	24·21
Matabeleland ...	223	3,810	2,562	17·08
Salisbury ...	340	10,490	4,628	30·85
Mazoe ...	117	2,774	3,556	23·71

Winter Crop (Irrigated).

	Acres.	Bags of 153 lbs.	Average Return per Acre.	
			lbs.	Bags.
Southern Rhodesia	484¼	13,646	4,227	28·18
Mashonaland ...	332¾	8,487	3,825	25·50
Matabeleland ...	151½	5,159	5,108	34·05
Salisbury ...	70	2,230	4,778	31·85
Mazoe ...	75	1,580	3,160	21·06

No. 5.—GROUND NUTS.

	Acres.	Bags of 83 lbs.	Average Return per Acre.	
			lbs.	Bags.
Southern Rhodesia...	1,523	10,471	550	6·87
Mashonaland ...	1,239	8,777	566	7·08
Matabeleland ...	284	1,694	477	5·96
Salisbury ...	335	2,652	633	7·91
Marandellas ...	231	946	327	4·09
Hartley ...	220	1,668	606	7·58
Mazoe ...	153	1,558	814	10·18

No. 6.—CITRUS FRUITS.

	Oranges.		All other Citrus.
	In Bearing.	Not in Bearing.	In Bearing.
Southern Rhodesia ...	24,937	58,570	10,087
Mashonaland ...	21,940	53,464	8,214
Matabeleland ...	2,997	5,106	1,873
Mazoe	6,759	17,745	998
Salisbury ...	3,619	3,315	2,342
Umtali	2,502	9,906	691
Melsetter ...	2,315	2,463	1,793
Marandellas ...	1,989	1,423	709
Hartley	1,936	3,047	554

Maize Grading, 1915.

By J. A. T. Walters, B.A., Assistant Agriculturist.

This was the second season in which the grading of Rhodesian maize was undertaken in this country, and a new system was introduced by which the work was done at the siding or station from which the grain was despatched, instead of at a central depôt, generally Salisbury, in the previous year. Instructions had been issued to farmers by the Farmers' Co-operative Society, and a notice had appeared in the *Rhodesia Agricultural Journal* and the daily press, regarding the methods to be employed in preparing maize for export and stacking the bags at the stations. On the whole, these instructions were fairly faithfully carried out, with the result that the work of grading was effected with much despatch. It had been estimated, from the returns supplied by the farmers, that approximately 500,000 bags would be available for export in the 1915 season. Five graders were employed altogether, who, after undergoing preliminary training, examined the maize prior to its being loaded on to trucks. Grading is an operation requiring judgment, skill and methodical care, and the decision must largely be left to the individual grader, but each received instructions that any doubtful cases were to be referred to the Head Office, Salisbury. Their work was performed satisfactorily on the whole, and in almost every case, where a reference was made to headquarters at the request of a farmer, the decision of the graders was found to have been correct. On account of freight difficulties, an urgent request was received from the manager of the Farmers' Co-operative Society that the great bulk of the maize should be graded before November, when the wool trade in the Union would further increase the difficulty of obtaining ships. This was done, and, thanks to the facilities provided by the railway, an ample supply of grain was conveyed to the coast for the freight available. By the end of November a return issued by the Farmers' Co-operative Society shewed that a total of 278,610 bags had already been shipped, with 33,316 bags still

on hand ready for shipment. These figures do not include the maize exported by the Eastern Farmers' Co-operative Society, amounting roughly to about 5,000 bags.

The whole of the maize exported came under the category of Flat Whites. The Salisbury White and Hickory King varieties grown in this country are among the finest samples of this class in the world. Practically no other variety of maize is grown, and Rhodesia may well be proud of the uniformity of the produce thus placed on the European market. Of Flat Whites, two grades only were exported, the standard for these grades being as follows:—

1st Grade (F.W. 1).—Maize to be sound, plump, dry and well cleaned, with a maximum of together 1 per cent. of discoloured or defective grain.

2nd Grade (F.W. 2).—Maize to be sound, dry and well cleaned, and to contain not more than 3 per cent. of defective grain, and 5 per cent. of discoloured grain.

These definitions are the same as those in use by the Government graders in the Union. Any grain below the standard required for Grade 2 was not given a certificate. By this systematic and conscientious grading, it is hoped to obtain and maintain for Rhodesian maize a reputation for quality and uniformity second to none on the European markets. Samples of each grade are placed with the principal Corn Exchanges, and buyers accept the Government grade certificates as a guarantee of quality. It will thus be obvious that it would be a grievous mistake to err on the side of leniency in the work of grading.

Of the 350,000 bags of maize (approximately) examined by the graders, about 7.2 per cent. were rejected for export. It frequently happened that farmers had less than 1 per cent. of rejected bags, while in some cases the rejections formed a large percentage. Among the causes of rejections, the chief were the following:—

(1) Discoloured grain.—This was particularly the fault where a husker and sheller had been used by the farmer, and he was consequently unable to remove any cobs that were partly or entirely discoloured by the weather or by fungus attacks.

(2) Broken grain.—This was a very general defect, due, on the evidence of the farmers, to the faulty working of power

shellers, and to defective sieving, as a result of trying to get more work out of the sheller than it was capable of.

(3) Damp grain.—Due presumably to harvesting the grain too early in the season, and remarked more particularly in the maize exported from the Shamva district. The maximum amount of moisture allowed for export is 12 per cent., but it must not be forgotten by farmers that maize absorbs moisture at the coast ports, and that consequently a greater degree of dryness should be aimed at here in Rhodesia. One consignment of maize rejected by the graders was actually covered by a considerable growth of green mould.

(4) Impurities such as dirt, chaff, sweepings, etc.—Although considerable numbers of such bags were found, it is probable that this was due to oversight, or careless handling and mixing of bags by the farmer prior to despatching to the siding.

(5) Small grain.—There were very few rejections from this cause, but in a great many cases bags that would otherwise be first grade were reduced to second grade as a result of a large admixture of small tip grains. If the sieving is properly done none of these small grains would pass with the larger ones, and it must not be forgotten that the extreme tip grains are not only defective, but are very frequently of a distinct yellow tinge, which considerably discolours the sample in which they occur.

(6) Inferior bags.—In a few cases second-hand bags were used, and also $2\frac{1}{4}$ lb. bags. Nearly all these were rejected. The farmer cannot expect such bags to convey his grain 8,000 miles.

(7) The presence of weevil was a comparatively minor evil, and as a rule Rhodesian grain, if exported by November, is free of this pest.

(8) Damage to bags from the attacks of ants occurred in some of the parcels graded in December, when the lowest tier on the ground was found to be affected, the bags very frequently being considerably eaten into.

If the above causes of rejections are carefully considered by the farmer, there is every reason to suppose that the percentage of rejections can be very greatly reduced, and with greater attention to the process of shelling, a higher

percentage of first grade may be secured. Owing to the abnormal conditions obtaining this year, there was but little difference in the price offered in Europe for each grade, but as the market becomes normal again, the first grade quality is bound to fetch a far better figure than the second grade.

The principal maize-exporting district this season was unquestionably Mazoe-Shamva. Along this line 257,100 bags were graded in all. The grain as a rule was of good quality and well prepared, the chief defect being dampness. The rejections were just over 6 per cent. of the total. On the Lomagundi line approximately 71,000 bags were examined, the rejections amounting to nearly 12 per cent. of the total. The figures given in the table below are necessarily not complete for the season, as there still remains a small quantity of grain to be graded, but from the available figures they indicate comparatively the number of rejections of each grade up to a date early in December.

	Total bags examined	1st Grade	2nd Grade	Rejected
		Per cent.	Per cent.	Per cent.
Mazoe-Shamva Line -	257,100	51·6	42·3	6·1
Lomagundi Line -	71,000	22·6	65·5	11·9
Salisbury-Norton Siding -	16,200	65·0	24·8	10·2
Salisbury-Umtali Line -	7,100	26·3	58·1	15·6
	351,400			
Average, whole of Rhodesia		44·1	48·7	7·2

The figures as they stand do not shew an entirely satisfactory position from the farmer's point of view. A higher percentage of first grade is undoubtedly possible in this country, while such a large proportion of rejections should disappear next season, as people learn what is required of them. The importance of the following points cannot be too strongly emphasised in this connection:—

Do not harvest your maize before it is thoroughly dry.

It is best to harvest the cob only, leaving the husk on the plant. In this way discoloured cobs can be discarded and discoloured tips can be removed.

Take care not to overload your sheller, and do not feed more rapidly than the sieves are able to receive and treat effectively.

Do not mix your sweepings and small grain with the bags destined for export. It only means unnecessary cartage to the station.

Use only new 2½ lb. bags, which should be doubly sewn, leaving lugs at the corners by which the bags can be handled.

Stack the maize at the station in tiers six high and two deep, with the sewn ends outwards. If maize is ridden in late in the season, it is a wise precaution to lay corrugated iron on the ground, to prevent damp and white ants from getting at the bags.

[Certain modifications of the grades and in the methods of procedure are in contemplation, of which ample notice will be given in anticipation to all interested.]

MAIZE GRADED DURING 1915.

July—December inclusive.

MAIN LINE.

Station	Grades		Total graded for Export
	No. 1	No. 2	
Umtali - -	418	971	1,389
Grand Reef -	225	350	575
Odzi - -	11	163	174
243½ Mile Peg -	521	974	1,495
Rusape - -	169	91	260
Matinidza -	1,023	76	1,099
Headlands -	531	1,564	2,095
			——7,087
Macheke -	—	773	773
Marandellas -	—	330	330
Marimba -	1,402	200	1,602
Hunyani -	4,338	2,311	6,649
Norton - -	5,225	1,623	6,848
	13,863	9,426	23,289

SHAMVA LINE.

Station	Grades		Total graded for Export
	No. 1	No. 2	
Selby - -	2,384	12,498	14,882
21 Mile Peg -	1,230	8,394	9,624
21½ Mile Peg -	1,608	1,712	3,320
Passaford -	12,786	16,907	29,693
27¼ Mile Peg -	—	2,917	2,917
28¾ Mile Peg -	—	1,376	1,376
31 Mile Peg -	1,036	1,310	2,346
33¼ Mile Peg -	1,645	794	2,439
Jumbo - -	2,307	880	3,187
Mazoe - -	3,204	524	3,728
39¼ Mile Peg -	659	216	875
Concession -	19,129	18,750	37,879
Glendale -	28,370	17,676	46,046
Virginia Farm -	2,958	2,049	5,007
Wolf Hill -	21,931	2,943	24,874
Insingisi - -	1,422	—	1,422
Bindura - -	18,156	12,038	30,194
Kimberley Reefs -	523	120	643
Wood Spur -	449	—	449
77 Mile Peg -	3,663	371	4,034
Shamva - -	8,547	6,958	15,505
	132,007	108,433	240,440

SINOIA LINE.

Station	Grades		Total graded for Export
	No. 1	No. 2	
Bluff Hill -	—	1,206	1,206
Mount Hampden -	1,689	3,521	5,210
14½ Mile Peg -	—	4,070	4,070
Stapleford -	7,601	6,879	14,480
Arden - -	—	601	601
Umsururu -	—	5,234	5,234
Wellesley -	—	233	233
Darwendale -	381	129	510
Maryland -	—	159	159
Banket - -	—	5,263	5,263
Dunphaile -	456	5,007	5,463
Eldorado -	3,559	2,682	6,241
Sinoia - -	83	13,867	13,950
	13,769	48,851	62,620

SUMMARY.

Line	Grades		Total graded for Export
	No. 1	No. 2	
Sinoia Line -	13,769	48,851	62,620
Shamva Line -	132,007	108,433	240,440
Main Line -	13,863	9,426	23,289
	159,639	166,710	326,349

The Salisbury Oil Factory.

By F. Eyles, F.L.S.

The Oil Factory established at Salisbury by the British South Africa Company last year has now been running, under the care of the Manager, Mr. Williamson, for thirty-five weeks, and has handled a first season's delivery of oil seeds. Our readers will probably be glad to hear something of the working results and prospects of the new industry.

In the first place, it may be said that the Oil Factory plant and buildings are on a small scale, because the installation is regarded in the light of an experiment. Justification for enlargement in order that an important and promising trade may be developed will only be found when the farmers accord energetic support by the production of raw materials in quantity, and there are hopeful indications that this support will be forthcoming, as the capacity of the little factory has been strained to the full in its first season. Its nominal capacity is between 7,000 and 8,000 bags of oil seeds per annum. The actual receipts so far have been approximately as follows:—Monkey-nuts, 10,000 bags; sunflower seed, 300 bags; castor beans, 100 bags; and three bags of linseed. It is evident, therefore, that the need for expansion already exists, and it will be difficult for the factory to handle the coming season's largely increasing production unless the plant is enlarged.

The operations of the factory may be considered under three heads:—(1) The production of oil for the market; (2) the soap business; (3) the oil cake trade. The prime purpose when starting was the production of various kinds of commercial oil, with oil cake and other bye-products as side lines, and already it has been found that the manufacture of soaps is likely to prove a profitable branch. The following descrip-

tive remarks refer to the treatment of monkey-nuts only, as the quantity of other material handled was unimportant, though a similar process with modifications may be used in the treatment of sunflower seed, castor beans, linseed, cotton seed, sesame and other oil-bearing seeds.

OIL.

The first stage in the manufacture of high grade oil for the market is the removal of the shells, and for this purpose the whole nuts are placed in a hopper on the top of the decorticating machine, thence they run down between revolving discs armed with projections, somewhat on the same principle as in the maize sheller. The shells are cracked, and the material falls between two sets of rollers, which are adjustable as to distance apart, and these give a preliminary crushing, so that the nut when it reaches the roller mill is in a relatively fine condition. Before leaving the decorticator, all shells and waste are blown out by means of two sets of winnowing fans. The crushed nuts are delivered below, and are then taken to the roller mill, which consists of five closely adjusted rollers. The material is made to pass between them all and is thus reduced to a coarse meal of uniform consistency.

The next step is the expression of the oil, and this is accomplished by means of a hydraulic press. The oily pulp is first placed in a number of press cloths, strong canvas bags, corresponding in shape and number to the series of plates or divisions of the hydraulic press. The mouths of the bags are folded over and the even distribution of the material within secured by a rapidly working steam packing or hammering machine. The full press cloths are then placed in the hydraulic press, one between each pair of plates, and when the press is full, they are subjected for about twenty minutes to a pressure of one and three-quarter tons per square inch. Under this heavy pressure the oil rapidly exudes, and runs down the sides of the press into suitable receptacles below, where it is collected ready for the next process. This is known as the cold pressure system, and it gives oil of the finest and clearest quality.

The oil now goes to the filter press, which consists of a number of layers of fine, strong canvas held in place by iron

framework. Through this the liquid is pumped under high pressure and emerges beautifully clear, of a bright, attractive colour, and free from all impurities. Nothing remains but to allow the oil to settle, when it is put up into bottles and is ready for sale.

SOAP.

When oil is required for soap-making purposes, the process is the same until the ground material comes from the roller mill, when, instead of going straight to the hydraulic press, it is first submitted to heat in a steam-jacketted pan, and then put through the press as before. The result of heating the crushed nuts is that a higher extraction of oil takes place in the press, but the oil is of poorer quality, and if marketed as oil would rank as second grade, though it is perfectly suitable for making soap. From the press it goes to the filter as above, but instead of being bottled, it is now transferred to large pans, where it is mixed with a concentrated solution of caustic soda and the mixture at once turned into rectangular tin frames, where it is allowed to stand while the chemical reactions take place, much heat being evolved in the process, and until the material becomes hard enough to be cut into cakes. This soap is then prepared for the market in two forms. Part of it is stamped into twin cakes somewhat similar in appearance to a well-known proprietary article, and part of it is cut into the familiar long bars.

A certain amount of scrap-soap is produced in the process of stamping, cutting and trimming of the bars and cakes. This is not wasted, but is collected, placed in soap boilers, and made into a special soap for natives. This, being cheap and of good quality, is becoming very popular, and a considerable and profitable trade is being built up.

OIL CAKE.

An important bye-product of the factory is the oil cake for stock feeding purposes. This consists simply of the contents of the press cloths when they come from the hydraulic press after the oil has been extracted. The hard, compressed cakes, consisting of the ground nut, less the oil extracted, are removed from the bags, broken into smaller pieces and then sacked ready for sale. Analyses, shewing the very high feed-

Fig. 1.—Oil Factory, Salisbury.

Fig. 2.—Soap and Oil made at Oil Factory, Salisbury

ing value for stock of this monkey-nut cake, will be found in the *Agricultural Journals* for August, 1915, p. 527; and October, 1915, p. 602. At the present price, owners of high grade stock will find the cake a profitable investment if judiciously used, and as a concentrated feed for finishing slaughter animals, and to increase the flow of milk, it is not to be surpassed.

There are planters of monkey-nuts who hold the view that it pays them better to keep their crop on the farm and feed it whole to their stock, rather than to sell the crop to the factory and buy back oil cake. It is doubtful if this is a correct view, for the following reasons:—The shell of the monkey-nut is indigestible and of little use even as a "filler." The whole nut has too high a percentage of oil, and too low a percentage of proteids. We will give figures to make this point clear. The factory pays £9 for 2,000 lbs. of unshelled nuts. Thirty per cent. of this weight is shell, which is valueless. Therefore 1,400 lbs. of shelled nuts, the real raw material of the factory, costs them £9, plus the charge for decorticating. Or, to bring it back to tons, 2,000 lbs. of shelled nuts is purchased for £12 17s. Therefore, for his nuts, without the useless shells, the farmer gets £12 17s., that is for a material which is not in fit state to feed to stock, and he can buy it back, after it has undergone an expensive process of manufacture whereby the undesirable excess of oil is eliminated and it is converted into an ideal concentrated feed, for £10 per ton. The monkey-nut cake sold by the Salisbury Oil Factory contains 41 per cent. of proteids, but the whole nut has only 18 per cent. of proteids; the relative proportion of proteids, not of course the absolute amount, being increased by the process of manufacture. The local price for cake does not compare unfavourably with other oil cakes offered in South Africa. Coco-nut oil cake, costing about £12 a ton in Rhodesia, contains only 22½ per cent. proteids; while palm-nut cake, costing about £11 a ton here, contains only 18 per cent. proteids. We are not arguing against a reduction in the price of the local cake, for we sincerely hope the Company will shortly see its way to reduce the same; but we wish to emphasise that even at £10 a ton the factory cake may be a sound investment for the stock owner carrying high-class animals, while as a feed it is in every way superior to the whole monkey-nut. Of course it is understood

that farmers, when feeding whole ground-nuts to their stock, usually employ them mixed with maize, in order to correct to some extent the excess of oil in the nuts.

GENERAL.

It may be worth while to point out to the community as a whole that there are advantages in encouraging the use of local products, for the retention of money that otherwise would leave the country for the purchase of imports tends to general prosperity. The appeal to the producers of oil-bearing crops is even more direct, for it manifestly benefits them to see a large and growing market for the finished article derived from their raw materials. Enough has been said as to the value of the oil cake, but the manifold uses to which the fine oil from monkey-nuts can be put are not perhaps sufficiently understood. It can successfully be utilised for general cooking purposes, for frying, for salads, for cakes and as a substitute in cookery in many cases in place of lard or butter. The soap is growing in popularity, it is cheaper than the imported article of the same quality, and is quite suitable both for washing clothes and for toilet purposes.

When the factory started, it was expected that the chief trade would be in the export of oils to the Union and overseas, but the transportation costs, owing to distance from the coast, make it doubtful if Rhodesia can compete against the manufactures of Europe. But a quite sufficient outlet, and a more profitable one, for all the factory can turn out for years to come, is likely to be found by catering for the local demand only in oil, and turning all the surplus oil into soap, for which a ready market exists.

Our illustrations are:—Fig. I., the exterior of the Oil Factory; Fig. II., a small display of the finished products, oils and soaps; while a view of the interior will be found on the front cover.

The Poultry of Rhodesia.

By Frank Sheppard.

To deal fully with the poultry industry of Rhodesia, one requires not only a knowledge of the industry from the point of view of the producer, but also a thorough knowledge of the commercial side and the markets, and as my knowledge of the latter extends only over a very limited area, I will deal with the subject as a poultry keeper pure and simple, and endeavour to indicate the points which appear to me to be the most important, and must be seriously considered to enable us to increase the output of our poultry products.

The poultry industry of this country is far below the standard of other branches of agriculture. Presuming the figures are correct, the Live Stock and Agricultural Statistics of Southern Rhodesia for 1914 gave us the remarkable figures that from 117,362 head of poultry possessed by farmers, only 116,177 dozen eggs were sold—less than one dozen eggs per bird per year. When we think that it requires three times this number of eggs to feed the population of New York City for one single day, we realise how small the figure is, and ask ourselves, "What is wrong with the poultry in Rhodesia?" It is not that we have no market for our eggs and table birds. The market here is giving good prices, which, even when eggs are most plentiful, leave a fair margin of profit; but at present the supply is very much smaller than the demand, consequently thousands of pounds leave the country annually which should go into the pockets of the poultry keepers. The increase in the number of birds which is required takes some time, and I shall not deal with this point at present, but intend to give a few hints to unsuccessful poultry keepers to enable them to increase the returns from the birds already in the country. Taking into consideration the number of male birds, turkeys,

ducks, geese, etc., and the eggs used for hatching and domestic purposes, the hens should have a greater margin for marketable purposes than shewn by the statistical returns.

From July to December our markets are well supplied with eggs, and prices are low but not unprofitable. It is during the first six months of the year that we must increase our egg supply, when prices are high. To do this, we must not try to force our moulting or breeding birds, but the great point is to hatch in the proper hatching season, that is, from April to August. Pullets hatched from April to June will be in full lay before the rains set in, and if properly fed and housed during the wet season, will continue to lay right through the year. Those hatched from July to August will also give a good account of themselves, but as they will not come on to lay until the rains have set in, their start will probably be delayed a short time.

The poultry industry is without doubt increasing, but there is still much room for improvement. During 1915 the quantity of eggs sent in to the markets greatly exceeded that of 1914, and from what I saw of many large consignments, there was no fault to find. The eggs were good-sized, clean and well packed. It can easily be understood that in many districts, which are inconveniently situated as regards a market, very few are sold, but it is impossible to understand why some districts shew such a poor return. In the Marandellas district, for instance, less than six eggs per head of poultry were sold during 1914. Whether these figures are correct or not, I cannot say, but half an egg per bird per month is incredible. Even in the Salisbury district, where there is always a ready market, the percentage is much lower than many outlying districts which are not so conveniently situated. In the Gwanda district there appear to be a few individuals specialising in egg production, with excellent results, ninety eggs per head being exceedingly good.

Although there is always a demand for good table birds, the supply is very limited. One of the chief obstacles the table poultry industry must overcome before further development is the prejudice of many breeders against heavy breeds. The impression that Wyandottes, Orpingtons, etc., are un-

suited to this country, owing to their tendency to become fat, is entirely wrong. When advice condemning heavy breeds in Rhodesia is given, it not only places a stumbling block before the poultry industry, but it shews that the individuals who are under this impression have little or no experience with heavy breeds in Rhodesia, or, if they have, their own birds have been hopelessly mismanaged. The reason why heavy birds do tend to put on fat in the hands of some breeders is not so much the feeding on our local grains, which almost without exception contain a high percentage of fat and carbohydrates, but a wrong system of feeding.

Heavy breeds when penned up should be given their morning feed of small grains (mealies must be crushed very small), scattered in deep litter, hay, leaves, etc., in a shaded place. This will keep them scratching for hours. If the birds are on free range, perhaps running round the homestead, do not throw a few whole mealies on the bare ground, but scatter small grains and finely-cracked mealies far and wide in the grass and small bushes under the trees. On wet mornings, a few bundles of hay thrown down in a cart shed or similar building will serve their purpose. If the grain is scattered in this litter, the birds will be kept scratching, instead of loafing around, too lazy even to lay eggs. If this system of morning feeding is adopted, there need be no fear of the birds putting on fat. The excess of carbohydrates will be worked off, the birds will keep in excellent health, and will not be attacked by the many complaints to which fat and lazy birds are subject. Soft food, as much as the birds can eat, should be given at night in troughs or dishes. This method of feeding applies to adult stock only. Further hints on local foodstuffs and feeding I hope to give at some future date. Above all things, do not give your birds a great feed of mealie meal porridge in the morning, and whole mealies thrown on bare ground at night! If this system does not kill the birds outright, it will certainly not encourage egg production.

There is one more erroneous impression regarding heavy breeds, especially White Wyandottes, viz., that they lay small eggs. This is simply a matter of strain, and is not the fault of the breed or the variety, but of the breeder, through injudicious selection of breeding stock, chiefly of the male

birds. Some of the greatest breeders who are breeding for high egg yields do not give enough consideration to the size of egg, but even when size is one of the chief points aimed at, we always find a few individual birds whose eggs do not reach the required standard. As an example, we find pens of White Wyandottes from the yards of one of the greatest utility breeders in England recently winning laying competitions in America and England, while a pen from the same breeder, competing in the Parafield laying contest, South Australia, was disqualified through the weight of the eggs per dozen not reaching the standard.

The presence of so many native fowls and so much native blood in the mongrels often seen in farm flocks, of course greatly affects the size of the eggs. Small eggs, unless sold by weight, are practically useless for market purposes, but, of course, can all be used for domestic purposes.

The number of pens of birds imported from England, Australia and elsewhere has provided the country with first-rate breeding stock, but I am afraid in many cases these birds have never had the chance to prove their value. Good prices are paid for pens, or sometimes only a cockerel, from the laying strain of some noted breeder. What often happens? Instead of the birds being housed separately for breeding purposes, they are turned out to run amongst the "stumers" round the homestead. The good points of the new arrivals are soon lost amongst the many bad ones already existing in the flock. If only a single cockerel is imported, we do not always find that it is penned up with a few selected layers, but it is turned out with the mixed flock, and there is little or no improvement in the birds.

The idea held by many people that poultry, when run on a larger scale than two or three dozen birds round the homestead, require so much attention that there is no time to look after them, is quite correct if it refers to unhealthy birds, badly housed, and chicks hatched during the wet season. A healthy flock well housed, and all the youngsters well developed before the wet season, will require very little attention. It takes less time to attend to the daily wants of a few hundred adult birds than it does to go through the hospital pens containing a dozen patients.

The keeping of accounts of receipts for eggs, etc., and expenditure on food, plant, labour, etc., is essential, if the business is intended to succeed. If this is not done, there is little means of determining whether the birds are giving a profitable return or not, and any leakage which may be absorbing a portion of the profits cannot be discovered.

There must also be a proper system and method in the management of the birds. The employment of native labour is no excuse for bad management of poultry, and once a native thoroughly understands his daily tasks, he will be found quite reliable. There are, of course, many natives who do not take to the work, but when this is the case, it is easily discovered in a day or two. Unless the native appears to take an interest in the birds, and realises their value and the necessity of strict attention to the many small details in connection with the work, he will be worse than useless.

To refer again to heavy breeds, or "weight varieties," as they are termed in America, I have found them to give excellent results in this country, and they will improve. The only drawback I have at present is that so many pullets develop their egg-laying organs too rapidly, and when trying to get size into your youngsters, it is unsatisfactory to have well-developed birds laying well and becoming broody before they are seven months old. The cause of this is, of course, greatly a matter of feeding, and I hope after another season's rearing to have overcome the difficulty.

It is a great misfortune that the poultry of this country has not received the same assistance and encouragement that has been given to other branches of agriculture. Up to the present each individual poultry keeper is working practically on "his own," with little or no means of gaining knowledge on the subject from birds kept for scientific and experimental purposes in Rhodesia. No publication has yet been written dealing extensively—from knowledge gained by practical experience—with every branch of the poultry industry under Rhodesian conditions. The standard works, weekly papers and other periodicals dealing with poultry in other countries will not give the Rhodesian poultry keeper one word of advice as regards the feeding and many other problems which he is

faced with. Even the local press, whilst publishing many excellent articles on all branches of farming, and full reports on the agricultural exhibits at our shows, almost entirely ignores the interests of the poultry breeder.

There are some, I am afraid, who, after reading these remarks, will think that I expect the farmer to keep flocks of pedigree layers on the system of a model poultry farm, but this is not the case. I do not for one moment expect the farmer to treat his poultry other than as a side line; but even as a side line, it is worth more attention than is given at present in many instances, and there is plenty of room for a general all-round improvement. The laying hens of America, the value of whose eggs would pay for relaying the whole of the huge railroad system in that country, average less than eighty eggs per year. Do the hens of Rhodesia average this? Ikona!

Now that the year is rapidly advancing, let the poultry keeper make the firm resolve to improve his poultry in some way which will bring him better returns. As the hatching season will soon be upon us, let him decide to hatch early this season, and not be tempted to wait till eggs and broody hens are plentiful, and prices low. This will be a start in the right direction, and at some future time, when the prices of suitable building material return to their normal level, the scrapping of all pole and dagga and grass death-traps, in which so many birds are housed, must also be considered.

Yet, in spite of lack of assistance and encouragement, and the nonsense that is talked about disease and the unsuitability of the country, we find that the poultry industry is increasing —slowly perhaps, but still it is increasing—and I sincerely hope it will continue to do so, not only till we are self-supporting as regards eggs and table birds, but till we have to look further afield for our market.

Determination of Sex in Mammals.

By H. E. Hornby, M.R.C.V.S., Fort Jameson.

The perusal of several letters on the above subject, published not many months ago in a well-known journal, gave me the idea that the results of recent research in this matter have been overlooked by most agriculturists. Not that there is any theory to-day that will fit all the facts now available; but sufficient advance in knowledge has been made to enable us to discard as worthless at least 99 per cent. of the hypotheses that have been advanced, since the time when Galen asserted "that the right side of the body, *being warmer* than the left, consequently produces males," and to shew that sex pre-determination is likely to remain entirely beyond man's control.

I have just been amusing myself tossing a coin. The result of the first thirty spins was:—"Heads," 23; "tails," 7. After a hundred and thirty spins, however, the result was:—"Heads," 64; "tails," 62. Now, none will dispute the statement that the chances in favour of one side turning up are exactly the same as those in favour of the other side; yet even in the few spins that I gave the coin, on one occasion "heads" turned up eight times running, and, on another, "tails" turned up nine times consecutively. It is certain, however, that if a coin be spun many thousands of times, the aggregate of "heads" will approximate very closely to the aggregate of "tails." The statistical study of sex reveals that ordinarily there is produced a practical equality in the numbers of the two sexes. According to Walter, who quotes various authorities, 106 human males are born to every 100 females, while the relative number of males per 100 females is given for horses as 99, and for cattle 94; while in pigs, rabbits and greyhounds the corresponding number of males is slightly over 100.

Apparently, then, the chances of any mammalian offspring being a male are the same as those of a properly spun coin turning up "heads." Since, also, any comparatively small number of births may contain a tremendous preponderance of one sex—just as "heads" may turn up twenty times running—it has not been difficult for advocates of crude theories to produce considerable "evidence" in support of their speculations.

It is impossible, within the bounds of a small article, to do more than mention even a few of these speculations. In the eighteenth century Dreylincourt had brought together 262 "groundless hypotheses"; and J. A. Thomson, writing in 1889, says that the number has been well-nigh doubled since. The four speculations that appear to be the most vigorous survivors are:—That the sex of the offspring depends upon the relative "vigour" of the parents, that it depends upon the relative ages of the two parents, that it depends upon the relative degree of "ripeness" of the egg (service at the commencement or close of œstrum), or, fourthly, whether the ovum comes from the right or left ovary. All these theories lack a scientific basis, nor are they supported by experience. If any one were true how easy would it be to determine sex. The author last quoted, in his book on "Heredity" (1908), says:—"More and more it seems being proved that the sex is fixed in the fertilised ovum, or earlier." Kellicott, in his "Textbook of Embryology" (1913), says:—"There are extant scores of hypotheses regarding the factors and processes involved in sex determination, depending upon the action of conditions outside of the germ itself. These must be abandoned when the facts now known to be true, of the germinal structure of a comparatively limited number of species, gain a wider applicability."

What are these facts to which Kellicott refers? I will try to answer that question. In the first place, we can limit the region of our enquiry by a short consideration of the subject of twins. I will quote from Walter's book on genetics:—"There are two kinds of twins, namely, ordinary twins, which come from two separately fertilised eggs each enclosed in its own chorion, and 'identical twins,' that have their origin in one egg which is enclosed in one chorion. Of the former, something like 30 per cent. in man are reported as being of two sexes, *thus shewing that it is neither nutrition nor environ-*

ment which determines sex. Usually when twins are of the same sex, they exhibit as great a range of difference in mental and physical traits as do ordinary children of the same fraternity born at different times, but occasionally 'identical twins' are born, and such monochorial twins are *always of the same sex.* This is evidence that *sex is determined in the germplasm at the time of fertilisation.*"

We can now confine our attention to the germplasm at the time of fertilisation. Everyone, of course, knows that the individual life of all the higher animals begins in the union of two minute cells—the spermatozoon and the ovum. We must consider these for a few minutes, and I am afraid that I must assume the reader to have sufficient biological knowledge to understand what is meant when I use simple words like "cell" and "nucleus."

A complete cell is made up of two principal parts, the nucleus and the remainder of the protoplasmic body, termed the cytoplasm. Of these, the nucleus concerns us the more. The chief distinction of the nucleus is the presence of a very special nucleo-protein substance called chromatin, and during certain phases of cell life the chromatin masses together into visibly definite structures or bodies called *chromosomes.* In many cases it has been possible to count these, and it has been found that (with certain important exceptions) the number is constant for each species. Thus, in the rat, guinea-pig and ox the number is sixteen.

Now, the ovum and spermatozoon, being cells, might be expected to contain the number of chromosomes normal to the species from which they are derived, but if that were the case, then, when the two cells unite in fertilisation, the number of chromosomes in the fertilised ovum would be double the normal. Actually, it has been demonstrated that the mature germ-cells (sperm and ovum) contain only *half* the number of chromosomes characteristic of the body cells, and so the fertilised ovum is furnished with the normal number.

"If each of the nuclei which unite in fertilisation has only half as many chromosomes as are characteristic of the species, it follows that a reduction of the number must take place in

the history of the germ-cells, and this is the outstanding fact in the process of *maturation*. Alike in the history of the egg (oogenesis) and in the history of the sperm (spermatogenesis), there is a parallel reduction in the number of chromosomes to one-half." (Thomson.)

"The one fact of maturation that stands out with perfect clearness and certainty is a reduction of the number of chromosomes in the ultimate germ-cells to one-half the number characteristic of the somatic cells. It is equally clear that this reduction is a preparation of the germ-cells for their subsequent union and a means by which the number of chromosomes is held constant in the species." (Wilson.)

Fertilisation, then, consists in the union of two cells—one, derived from the mother, the ovum; the other, derived from the father, the sperm—each of which contributes one-half of the chromosomes found in the fertilised ovum.

Development of the embryo commences with the division of the fertilised ovum into two similar cells, the process being preceded by the division of each of the chromosomes into two. After that, each of these cells grows and divides in a similar manner, and so it is easy to understand how it is that all the cells of the body have a constant chromosome number.

I have laid a good deal of emphasis on the importance of chromosomes, for the following reason:—"The conclusion resulting from the study of Mendelian heredity, that the organism is a sum of 'unit characters' which in the organism interact with one another, so as to produce a physiological whole, but which in heredity are more or less clearly separable units, affords strong evidence for the general hypothesis of the representative particle composition of the germ nuclei. *Chromosomes might thus represent groups of such 'units,'* or, in occasional instances perhaps, single units, although this must be the case only rarely, for the total number of unit characters is far in excess of the number of chromosomes." (Kellicott.)

The reader may think that I have wandered far from my original subject; but I have not, as is to be now revealed:—

"During recent years many instances have come to light of a variation in the number of chromosomes in different individuals of a single species. With but very few exceptions, these numerical differences are associated with *difference in sex*, and when any such difference exists it is usually found that the cells of the female contain one or more chromosomes in excess of the number found in the male. In other cases the equivalent diversity of the chromosome groups is indicated by size differences between the members of a certain chromosome pair." (Kellicott.)

When one remembers the minute size of a cell—a human ovum is about 0.25 mm. in diameter, and the volume of a human sperm is roughly only about $\frac{1}{195000}$ that of the ovum—one is not surprised that the counting and examination of chromosomes is a matter of extreme difficulty, and that there are so many gaps in our knowledge. We have, however, sufficient data to allow us to make certain generalisations.

In man, the chromosome number for the male is 22, and for the female 24. During maturation of the ovum the number is halved, so that the ripe ovum contains 12 chromosomes. The events of spermatogenesis do not run quite parallel, however, with the result that *half the sperms contain* 10 *chromosomes, and half contain* 12. Therefore, in fertilisation there are but two possibilities. The egg with its 12 chromosomes may be fertilised by a sperm with 10, when a "male" cell containing 22 chromosomes is produced, or it may be fertilised by a sperm containing 12 chromosomes, when a "female" cell containing 24 chromosomes will result. We see then that, in the case of man, sex is determined at the time of the fertilisation of the ovum, and since there are produced equal numbers of 10- and 12-chromosome spermatozoa the chances of the ovum being fertilised by one or the other are equal.

Differences of these kinds are now known in many scores of species of many groups, from the lower worms to man. The difference is not necessarily quantitative, as in the instance just given; it may be qualitative. In either case, it seems certain that, with difference in sex, there is invariably associated a definite difference in the character of the chromosomes present in the germ-cells. In Mendelian language, we may

say that, so far as mammals are concerned, the females are homozygous with respect to sex, and the males heterozygous, that is, we may represent a female by the symbols ♀ ♀, and a male by the symbols ♂ ♀. Mating of these must inevitably produce ♀ ♀ and ♂ ♀, and so equality in the numbers of males and females produced is maintained.

Although I have dealt so superficially with the subject, I hope I have said enough to convince the reader that Castle was probably correct when he said, "Negative as are the results of our study of sex control, they are perhaps not wholly without practical value. It is something to know our limitations. We may thus save time from useless attempts at controlling what is uncontrollable, and devote it to more profitable employments."

To those desirous of knowing almost all that is at present known about this fascinating subject, I can recommend the following book, "The Determination of Sex," by L. Doncaster, Sc.D. (Cambridge: at the University Press, 1914. Price 7/6 net.)

Rhodesian Citrus Pests.

By Rupert W. Jack, F.E.S., Government Entomologist.

A very considerable proportion of the enquiries concerning noxious insects received by the Entomologist relate to those affecting citrus trees, and it is felt that there is need for a pamphlet dealing with the more important pests with which the budding industry of citrus culture in this Territory has to contend. The present paper makes no pretence at an exhaustive treatment of the subject, if for no other reason than the fact that an exhaustive knowledge of our various pests is not yet at the writer's command. The aim is to place in the farmer's hands a means of recognising the more common pests of his citrus orchard and of ascertaining their habits and the means that may be employed to mitigate their ravages.

As there seems to be a general impression amongst citrus growers in Southern Rhodesia that they have to contend with a great deal more in the way of destructive insects and plant diseases than their fellow-growers in other parts of the world, it may be as well to state that this is by no means the case. Citrus trees in this Territory are as a rule remarkably healthy, and, if grown on suitable soil and properly tended and watered, certainly need no more attention in the aggregate, as regards pest and disease, than those grown elsewhere.

Foremost amongst citrus pests in any country must be placed the Scale Insects, and these will, therefore, be dealt with first. Before proceeding to a detailed description of our various species, however, it seems desirable to give a general idea of what a scale insect actually is, as this elementary knowledge is not as generally distributed as might be wished. The derivation of the term "Scale Insect" is, of course, obvious, but owing to zoological affinities, it has been found necessary

to include in the term many insects, including the famous "Australian Bug," which are not scale-like in appearance. Scale insects may be divided into two groups—the Armoured Scales and the Naked Scales. Without going into details, it may be stated that the armoured scales, with the exception of the newly-hatched or newly-born young and the adult males, are covered with a shield consisting of moulted skins and secretionary matter from the insects themselves, whilst this is not the case with the naked scales. In examining a branch infested with the Red Scale, for instance, what is mainly seen is the shield-like covering of the insect, although a close inspection with a lens shews this covering to be semi-transparent, the form and dull orange colour of the insect itself being discernible through the scale. It is not easy to separate the females of the Red Scale from their scaly covering, owing to the part of the scale that lies between the insect and the leaf adhering very strongly to the upper portion, but with the Circular Purple Scale the top covering may be lifted on the point of a pin and the yellow scale itself is immediately visible.

All the scale insects live by sucking the sap from the tissues of plants, and for this purpose they are, with the exception of the adult males, provided with a sucking apparatus, very long in proportion to the size of the insects. The adult males are frail, two-winged insects, generally so small as to be altogether overlooked. They are destitute of mouthparts, and are short-lived, their sole object in life being the fertilisation of the females. In addition to the harm they do by extracting the sap from plants, many of the scale insects are believed to excrete a definite poison which causes the death of the tissues on which they feed.

The Red Scale (*Chrysomphalus aurantii*).—This insect, which is also known as the Californian Red Scale, is one of the most widely spread and probably the most destructive of the enemies of citrus trees. The insect is shewn at its natural size on a twig of lemon on Plate I., Fig. 1, and enlarged about three diameters at Fig. 2. The scale of the adult female is rather flat, yellowish grey and semi-transparent, but the dull orange colour of the insect beneath gives it a dull red colour. More or less in the centre of the scale is to be seen a prominent spot with a ring of whitish secretion. This is the remains of

the cast skin and first secretion of the larva or young. The diameter of the scale of an adult female is about one-sixteenth to a twelfth of an inch. Besides the scales of the adult females, many of the smaller circular scales of the immature females and the larvæ may be seen on infested plants, together with the paler and more elongate coverings of the immature males. It should be mentioned that, with the exception of the newly-hatched young and adult males, all the armoured scales are destitute of functional legs, and are therefore immovably confined to the spot on which they first settle and moult their larval skins.

The Red Scale is distributed throughout Southern Rhodesia, attacking citrus trees of all sorts, being most severe on lemon, orange and grape fruit. Naartje trees appear to suffer but little from this pest as a rule. Apart from citrus trees, this insect attacks a wide range of plants, including rose, pear, apple, fig, mulberry, privet, syringa, as well as several species of acacia and many other plants. In spite of the wide range of host plants and general distribution of the pest, however, there are a great many orchards in the Territory that are entirely free from the pest, and in several, where it occurs, it has not been found to be particularly destructive. On the other hand, in the towns, where the trees get dusty and are often ill-nourished, the Red Scale is as bad a pest as elsewhere, trees being commonly killed outright. It may be mentioned that the owners of certain orchards near Salisbury are of opinion that the Red Scale has decreased naturally during the past six or seven years, and the Government Entomologist has devoted some time to the study of this phenomenon, without, however, being able to find any explanation of the reported decrease. The scale in the orchard examined at intervals shewed no signs of suffering from either parasites or the attack of predaceous enemies, such as ladybirds, or of disease. Certainly no reliance can be placed at present on any means of natural control for Red Scale. Scale increases and decreases in an unexplained manner at times, the causes being obscure. The fact to bear in mind, however, is that the presence of Red Scale in an orchard is a menace to the health of the trees, and when the portion infested in an isolated orchard is small, every effort, not excluding destruction of the infested plants, should be made to get rid of it.

Habits of the Red Scale.—This scale attacks all parts of citrus trees, including trunk, branches, twigs, leaves (both sides) and fruit. Breeding takes place most abundantly in the dry hot months preceding the rains, namely the latter part of September, October and November. The young scales either hatch within the mother or within a few hours of the extrusion of the eggs. These young scales may be seen on the leaves as minute yellow specks. Under a good lens they may be seen to possess six legs, with which they are able to crawl to a suitable spot for inserting their sucking tubes. The active stage of the young larva is of short duration. After coming to rest they cast their skins and their legs with them, and shortly commence to secrete the scaly covering, in which the larval skin is partially embedded. The females cast their skins several times before they become sexually mature, but do not undergo any marked change of form. The males undergo a change to a pupal form, corresponding to the chrysalis stage of a butterfly, from which they emerge as tiny winged insects.

Natural Enemies.—Certain ladybirds feed upon the Red Scale, but they are by no means confined to this species as a diet, and will be dealt with under another heading. The writer has not yet found any indication of parasitisation of this scale in Southern Rhodesia. On the Portuguese border, where conditions are sufficiently moist to allow lichens to flourish on apple trees, for instance, a red fungus attacks the Red Scale very freely, and undoubtedly has some effect in checking the insect there.

Control Measures.—Fumigation with hydrocyanic acid or spraying with resin wash. These processes will be dealt with later.

Circular Purple Scale (*Chrysomphalus aonidum*).—This species, also called the Florida Red and the Round Scale, is closely related to the preceding, from which it is, however, very easily distinguished. Its size and form may be seen by reference to Plate II., Fig. 3. The colour of the female scale is a very dark brown, being paler towards the margin. The whitish raised disc in the centre, surrounded by the yellowish red ring of the cast nymphal skin, together with the dark colour, is sufficient to distinguish this from allied species. The scales of the immature females are paler than those of the

adults, whilst the young scales are very pale with a conspicuous raised white disc of secretionary matter, which becomes largely rubbed off or otherwise reduced by the time the adult stage is reached. Immature males are to be found sparingly both on citrus in the open and on palms under glass in the Territory. This species is not generally distributed as an outdoor pest in this Territory, but where it occurs it appears to thrive quite as well as the Red Scale. Out of doors in Southern Rhodesia it has only been observed on various species of citrus and under glass on palms. Wherever observed, the infestation has been of an intense nature.

Habits of the Circular Purple Scale.—These are similar to those of the Red Scale, except that the eggs are extruded considerably longer before the larva hatches out. The attack on trees is almost confined to the foliage and fruit, though a few scales may be seen on the petioles and green twigs. The insect is not as destructive to the trees as the Red Scale, but it causes yellowing of the leaves, which seem to drop easily, and the fruit is very much disfigured by the presence of the scale.

Natural Enemies and Control.—As for Red Scale.

Larger Red Scale (*Selenaspidus silvaticus*).—For the determination of this species, the writer is indebted to Mr. C. R. Brain, of the S.A. Union Department of Agriculture. As may be seen by reference to Plate I., Fig. 3, where an infested lemon leaf is shewn at natural size, this is considerably larger than the Red Scale, the female scale measuring about one-tenth of an inch in diameter. The colour is yellowish brown, the central area being yellowish and not very conspicuous. Some of the older scales become very light grey, the cast skins in the centre, however, usually retaining their colour. This species has been found on orange at Umtali and on lemon at Marandellas, in both cases infesting the foliage. It is common on palms under glass in the Territory, and was probably introduced by this agency. It cannot be considered a pest of citrus trees at the present time, but, as it is undoubtedly capable of increasing out of doors in these latitudes, it may prove troublesome in time, and is therefore worthy of note.

Control Measures.—Similar to those applicable to the Red Scale.

Purple or Mussel Scale (*Lepidosaphes beckii*).—This is a species of very different appearance to the three preceding, although it belongs to the armoured group. At Fig. 1 on Plate II. may be seen a drawing of three adult female scales, very greatly enlarged. The origin of the name "Mussel Scale" is apparent from the shape and appearance of the scaly covering. At Fig. 2 on the same plate an attempt is made to shew in a semi-diagram the size and appearance of the scale on an orange leaf, and also the manner of infestation. The adult female scale attains a length of from a twelfth to an eighth of an inch. The colour is really a dark reddish brown, and not purple as its name implies. The cast larval skin situated at the narrow extremity of the scale is pale yellow in colour, but in old specimens is frequently much darkened. The scale, however, is very easily recognised, and a detailed description beyond the shape, size and general coloration would serve no useful purpose in this paper. This is a widely distributed pest of citrus trees, but in Southern Rhodesia is only known to occur in the neighbourhood of Umtali, where, however, it seems to have found conditions favourable to its development. In this Territory it has only been found on citrus, but Mr. E. O. Essig, in California, gives the following list of food plants:—All citrus species, fig, olive, croton, oak, Elæagnus, Banksia integrafolia, Taxus cuspidata, Cercidiphyllum japonicum and Pomaderris apetala.

Habits.—The young hatch from eggs laid under the female scale, and in California are stated to mature in from four to six months. The scale attacks the branches, foliage and fruit of old trees, and is found on the main stems of nursery trees. It is a destructive pest and difficult to eradicate.

Natural Enemies.—Nothing is known of these in this Territory.

Control.—Fumigation with hydrocyanic acid gas, but this species does not yield so readily to treatment as the Red Scale.

Brown or Soft Scale (*Coccus hesperidum*).—Although this insect bears the name of "brown scale," the natural colour of the bulk of adult females in life is greenish yellow, spotted and streaked to a greater or lesser extent with brown, although old specimens are considerably darker, whilst the younger

examples are of a uniform pale yellow. The name "Soft Scale" is more appropriate, as it refers to the lack of the secretionary shield characteristic of the armoured scales. The present species has no mechanical protection except its own back, and falls therefore into the sub-division of naked scales. The Soft Scale is easily distinguished from the other species dealt with in this paper by the colour, by the oval form, which ranges from a short oval in the adult females to a somewhat elongate oval in the young, and, of course, by the absence of any secretionary covering, although the citrus grower might be in doubt about the latter. The adult females, that is to say, the largest scales present, vary in length from a twelfth to a little over an eighth of an inch, and in breadth from a twentieth to a tenth of an inch. The more mature the female, the more convex her form becomes. In addition to insects of the form and colour described, a varying number of individuals will be found on infested branches of very convex form and with the whole of the scale except the edges nearly black in colour. These are sickly individuals which contain internal parasites, to which reference will be made later. A spray of naartje infested with the insect is shewn at natural size on Plate III., Fig. 1.

A notable characteristic of the Soft Scale is its power to produce a sweet substance called honey dew. This is not a peculiarity of this species, nor indeed of the family, as the power is shared by plant lice and other insects. The honey dew spreads over the surface of infested leaves and twigs, dropping also on the foliage and fruit below, and is invariably accompanied by the growth of a black mould (*Capnodium citricolum*) which renders the heavily infested trees very conspicuous. Honey dew is also secreted by the citrus aphis, which will be dealt with later, and the blackening of the foliage is a sure indication of the presence of one of these two pests. This mould is deleterious to the health of the trees, as it blocks up the breathing pores of the leaves and so interferes with their natural functions. The honey dew also attracts ants in great numbers, which may often be seen running up and down the stems of infested trees.

Whatever the Soft Scale may be elsewhere, it is a bad pest of citrus trees in this Territory. It is the most prevalent scale

of all in our citrus orchards, and few are entirely free. The manner in which the species becomes introduced into isolated orchards is sometimes a matter for speculation, as trees procured from the most reputable nurserymen in the S.A. Union, guaranteed to have been fumigated before despatch and quite free from any other scale pest, frequently become infested within a few months of being planted out. It is commonly stated that the pest must occur on native plants all over the veld in order to account for its otherwise unexplained appearance in isolated citrus plantations, but there is nothing to support this view, which is on the face of it very unlikely. The insect thrives on a great variety of plants other than citrus, especially on many ornamental plants, and possibly this explains its introduction to new farms in many instances.

The young emerge in an active state from the mother scale. The species is very prolific, and the insect is stated to mature in California in from three to five months. The foliage and young growth of the trees are the parts affected, and, when the infestation is heavy, the growth of the tree is seriously checked and the tree rendered altogether unthrifty. Trees which are sickly from other causes are commonly very badly infested with the scale, it being a general rule as regards scale insects that they thrive best on sickly trees, shewing that the healthy tree has at least some slight power of resistance to attack.

Natural Enemies.—Were it not for natural checks, this scale would be a much worse pest than is actually the case. The most effective checks are certain minute wasps, which are internal parasites of the scale, and destroy a very great number. The parasitised scales swell up and become blackish in colour, as already mentioned. These parasites have not been identified in this Territory, but are doubtless of the same species as those occurring at the Cape. Besides internal parasites, at least one species of ladybird feeds upon this pest, and the carnivorous caterpillars of a species of moth (*Eublemma sp.*) are not uncommon. These caterpillars form a case composed of the skins of their victims, and when disturbed are able to draw this tightly to the surface on which they are crawling. This gives them the appearance of large scale insects themselves. The caterpillars have not been seen in important numbers in

Southern Rhodesia. Certain small birds also feed on the scale, but in spite of natural enemies generally the scale has the power to increase and do a great amount of harm.

Control Measures.—Similar to those applicable to Red Scale, but this species is more easily killed by washes. Owing, however, to its great powers of increase, it cannot be said to be an easy insect to eradicate.

Australian Bug (*Icerya purchasi*).—This insect is also called in America the "Cottony Cushion" or "Fluted Scale." Few names of fruit tree pests are better known in South Africa than that of Australian Bug, and, in spite of the lapse of nearly a generation since the severity of its ravages diminished, individuals have not yet lost all the dread that its name used to inspire. The history of this pest is a remarkable one. Its original home, as its name implies, was Australia. From there it was introduced to several other countries, including New Zealand, California and South Africa. Of comparatively little importance in Australia, it flourished so exceedingly in its new homes as to threaten the extinction of the citrus industry as well as destroying great numbers of ornamental trees. Many remedies were tried in vain, and it was not until the introduction of the Vedalia Ladybird (*Novius cardinalis*) from its home in Australia, where it preys upon the "bug," that the ravages of the latter were checked. At the present time the Vedalia Ladybird is generally distributed throughout South Africa, and in common with a native species generally termed the Rodolia Ladybird (*Aulis fœdata*), serves to keep the Australian Bug from doing serious damage. On isolated farms, however, the pest sometimes increases very greatly, owing to the absence of its checks, and in the South African Union it is the practice to forward a colony of Vedalia to such farms on application and the payment of a fee. In Southern Rhodesia this is rarely or never necessary, at least partly due to the fact that the native ladybird Rodolia seems either to be more generally distributed or to act as a more efficient check in these latitudes. This subject will, however, be dealt with more fully later.

The Australian Bug needs no description, as it is entirely distinct from all other citrus pests. A glance at Plate III., Fig. 2, will suffice to indicate its characteristic appearance to any

who may not be familiar with it. The white sac behind the insect contains the numerous eggs. The young larvæ hatch inside the sac and make their way up the branches, frequently settling on the midribs of the leaves, from which, however, they return to twigs and branches before attaining maturity.

Natural Enemies.—The imported Vedalia Ladybird (*Novius cardinalis*) and the native Rodolia Ladybird (*Aulis fœdata*).

Control.—This insect is effectually controlled by its natural enemies, which may be relied upon to put in an appearance if the pest increases unduly.

REMEDIAL MEASURES AGAINST SCALE INSECTS.

By far the most effective remedial measure against scale is the fumigation of the trees with hydrocyanic acid gas. A pamphlet dealing fully with this subject may be obtained from the Department of Agriculture, the article of which the pamphlet is a reprint having appeared originally in the number of this *Journal* for April, 1911. It is not, therefore, intended to deal very fully with the subject in this paper, but a brief outline of the process may be given. The operation consists in covering the infested tree with a more or less air-tight sheet or tent, and generating beneath it hydrocyanic acid gas by the treatment of potassium cyanide with dilute sulphuric acid. In California a high grade of sodium cyanide is replacing potassium cyanide for fumigation, but it appears doubtful if the grade of sodium cyanide procurable in Southern Rhodesia is a sufficiently high one for use in this connection. With reference to fumigation covers for trees, mention may be made of the names of Messrs. Alex. Cameron and the Gourock Rope Co. of Capetown, who make a speciality of supplying these articles.

For generating the gas the chemicals, whatever quantity may be employed, are used in the proportion of potassium cyanide 1 oz. by weight, commercial sulphuric acid 1 oz. (fluid), and water 2 to 3 ozs. The acid may be poured into the water (never *vice versa*) and the cyanide added, or the cyanide may be placed in the water and the acid added. In the latter case, care should be taken not to leave the water and cyanide long

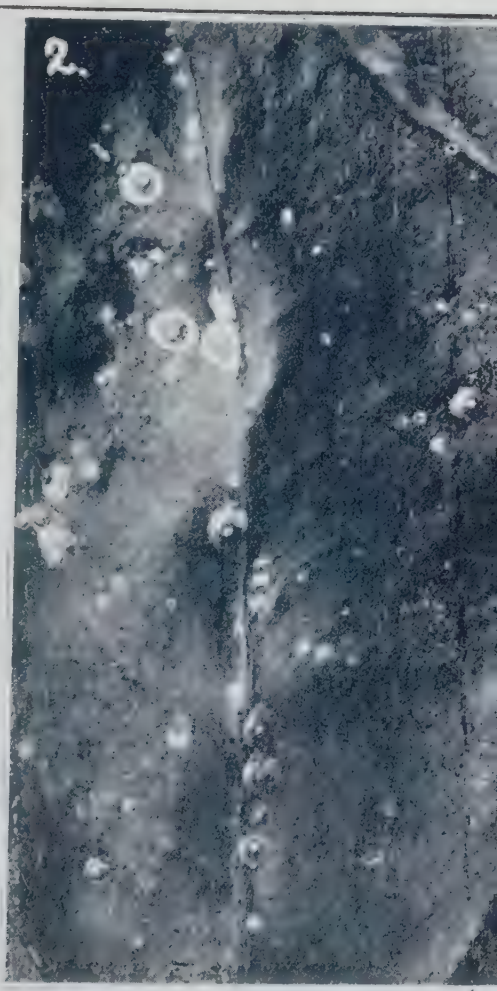


Plate I.—Rhodesian Citrus Pests.

Plate II.—Rhodesian Citrus Pests.

Plate III.—Rhodesian Citrus Pests.

in contact, as if much cyanide is in solution the re-action will be very violent and splashing result. Similarly, water should not be added to the acid, as the latter, being heavier, remains at the bottom of the vessel, and, combining violently with the water, also causes splashing. Suitable generating vessels are round earthenware pudding basins. Enamelled ware should be avoided on account of the tendency of the enamel to crack and expose the metal, and tins are, of course, quickly eaten through by the acid. The following table of quantities suitable for fumigating trees of various sizes is due to Lounsbury, and appeared in the pamphlet on fumigation mentioned above. It is only approximate, the aim being to use as strong a dose of gas as the trees will stand without serious burning of the foliage resulting. A little experience will quickly enable the operator to judge the right quantities.

TABLE OF DOSAGE FOR TENTED TREES.

Measurement over Tent.	Circumference of Tent.	Height of Tree.	Diameter of Tree.	Water.	Acid.	Potassium Cyanide.	Space enclosed.
feet.	feet.	feet.	feet.	fl. oz.	fl. oz.	oz.	cubic feet.
9½	9½	4	3	½	½	¼	25
14¼	12½	6	4	1	½	½	65
15½	19	6	6	2	1	1	140
19½	19	8	6	3	1½	1½	200
24½	25	10	8	5	2½	2½	435
28½	25	12	8	6	3	3	535
30	31½	12	10	7	3½	3½	815
34	31½	14	10	8	4	4	970
35	38	14	12	10	5	5	1,355
39	38	16	12	12	6	6	1,585
40	44	16	14	15	7½	7½	2,105
44	44	18	14	16	8	8	2,415
45	50	18	16	20	10	10	3,085
49	50	20	16	22	11	11	3,485
50¼	56½	20	18	26	13	13	4,325
54¼	56½	22	18	30	15	15	4,835
59½	63	24	20	40	20	20	6,500

Trees should remain covered for forty-five minutes after the tent has been charged. Fumigation must be carried out in the

absence of sunlight and of high winds, and is, therefore, usually performed at night. Perhaps this is the reason why the practice has not "caught on" to the same extent as spraying in this Territory. This is a regrettable fact, because it is far more efficacious and satisfactory than the most thorough spraying.

Cautions.—(1) Trees which have been sprayed with Bordeaux mixture within a period of six months should not be fumigated, as a chemical re-action occurs which is exceedingly harmful to the tree. (2) Operators must never forget that cyanide of potassium and hydrocyanic acid gas are exceedingly deadly poisons, and are not to be dealt with carelessly. There is, however, no danger from the gas in fumigating under sheets and tents, as, on removal of the tent, the remains of the gas becomes immediately mixed with enough air to render it harmless. Any grower intending to take up the practice of fumigation is invited to write for the pamphlet mentioned above and to apply for any special information to the Government Entomologist at Salisbury.

Resin Wash.—Next to fumigation, spraying with resin wash is the most effective means of combating scale on citrus trees. The formula for this substance as given by Lounsbury is as follows, except that it is sometimes more convenient in this Territory to use raw linseed oil in place of fish oil, tests having shewn it to be quite as effective:—

Resin	24 lbs.
Caustic Soda 98 per cent.	5 lbs.
Fish Oil or raw Linseed Oil	2 bottles.
Water to	100 gallons.

Crush the resin, which may easily be done by pounding it in a meal sack. Put fifteen gallons or more water in the cooking pot, stir in the soda and oil, and bring to a boil. Then gradually stir in the powdered resin, never letting any settle, and boil for ten or fifteen minutes after all is dissolved and the solution is like strong coffee in colour. The preparation may take less than three-quarters of an hour if the resin is well crushed and not allowed to settle, but may take two or even three hours if the resin collects in a mass. Add hot water, or cold water very gradually, if mixture foams up strongly, and

when cooking is complete bring amount of liquid up to twenty-five gallons at once. Good until used and should keep without settling; if settles, boil until all again dissolved. Remaining water, hot or cold, may be added at any time.

When made without fish oil, the wash seems practically as good as with it for soft scales and for aphides. If fish oil or raw linseed oil is not procurable and the wash is needed for hard scales, use six pounds of good soft soap in its place.

Resin wash at two-thirds the strength given is strong enough for most aphides, but for Woolly Aphis full strength wash had best be used. To obtain the best results, resin wash should be applied warm.

Paraffin Emulsion.—Paraffin emulsion, prepared as follows, is sometimes used against scale insects, although it is by no means as effective as resin wash. It is generally considered to kill the young scales only, and so needs repeating a number of times at short intervals in order to clear the trees, and in this way becomes an expensive treatment. It is more effective against aphides. The formula used at the Cape is as follows:—

Soap	1 lb.
Paraffin Oil	4 gallons (1 tin)
Water to	60 gallons

Cut up soap and boil until dissolved in two gallons of water. Remove from fire and immediately add to the oil. Churn violently; fully five minutes if with a pump, or ten to fifteen minutes if with a paddle. Should keep without separating in concentrated condition; and when made as directed one part of the concentrated emulsion to nine of water gives the proper dilution. For many aphides, twelve to fifteen parts of water is not too much.

For use in gardens a simple wash may be made by heating up 1 lb. of soft soap in two gallons of water. Care should be taken to use only soft soap, as so strong a solution of coarser soaps may do serious damage to the foliage. This wash is too expensive for use on a large scale.

In Southern Rhodesia the best time for spraying is probably in October or November, when breeding is proceeding

most rapidly. In spraying for any scale it is always best to give the tree at least two treatments, the second treatment from fourteen days to three weeks after the first. This is due to the fact that the action of the washes is greatest on the young scales, and the second spraying aims at destroying any young that have been produced by eggs or females that have survived the first application. The second spraying is especially necessary in treating trees infested with the Purple Scale (*Lepidosaphes beckii*). Trees should not be fumigated or sprayed when in full bloom.

Cautions.—(1) It is not only unnecessary but harmful to continue spraying a tree until the liquid runs down the trunk into the soil; an even covering of the foliage and branches is the ideal to aim at. (2) It is highly injudicious to spray trees with a mixture of cattle dip, paraffin and soap, as is sometimes done. Cattle dip contains soluble arsenic, which is deadly to vegetable tissues, and should never be used for spraying trees. Instances of the entire defoliation of fair-sized blocks of trees from the use of cattle dip have come to the notice of the Department.

In order to obtain the most satisfactory results from spraying, the liquid must be delivered through a suitable nozzle under high pressure (from 100 to 150 lbs. per square inch). The nozzles most generally used for applying contact insecticides are the Vermonel or Bordeaux or other makes of similar patterns. In gardens the trees may be sprayed with a bucket pump if furnished with a sufficient lead of hose pipe, the short length supplied with the machines being insufficient for this purpose. Knapsack pumps may be used on young orchard trees, but for an orchard of any extent, after the trees have attained any size, a barrel pump mounted on wheels or a Scotch cart is essential. There is a number of good makes on the South African market, though they are not as a rule stocked in Rhodesia. The names of Messrs. Jas. Robertson & Co., Messrs. George Findlay & Co. and Messrs. Koch & Dixie, of Capetown, and Mr. H. F. Benger, of Johannesburg, may be mentioned in connection with spray pumps suitable for orchard use. An article entitled "Selection of a Spraying Outfit" appeared in the number of the *Journal* for February, 1911.

(*To be continued.*)

EXPLANATION OF PLATES.

Plate I.—Fig. 1. Red Scale (*Chrysomphalus aurantii*) on lemon; natural size.

Fig. 2. Red Scale enlarged about 3 diameters.

Fig. 3. Larger Red Scale (*Selenaspidus silvaticus* —Lind.) on lemon; natural size.

Plate II.—Fig. 1. Purple or Mussel Scale (*Lepidosaphes beckii*). Adult female scales very greatly enlarged.

Fig. 2. Semi-diagram of orange leaf infested with Purple Scale to shew approximate size and manner of infestation.

Fig. 3. Circular Purple Scale (*Chrysomphalus aonidum*) on shaddock; natural size.

Plate III.—Fig. 1. Brown or Soft Scale (*Coccus hesperidum*) on naartje; natural size.

Fig. 2. Australian Bug (*Icerya purchasi*) on orange; natural size.

Export of Rhodesian Citrus Fruit.

By A. G. Turner, Government Citrus Adviser.

Some reference was made recently in the local papers to the consignment of citrus fruit which arrived in London on 16th October, by the "Balmoral Castle," on which the South African Trades Commissioner reported favourably. A fuller statement on the Rhodesian portion of this consignment, which consisted of 50 boxes of oranges of the Valentia Late variety from the B.S.A. Co.'s Premier Estate at Umtali, should be of great interest to growers in this Territory. Through the courtesy of the Manager, B.S.A. Co., Estates Department, the full statement of the account sales of this consignment of fruit is given :—

Southampton, 29th October, 1915.

Statement of sales of fruit *ex* "Balmoral Castle" for account of the British South Africa Company, by Messrs. Perkin and Adamson.

Date Received.	Marks.	No. of Boxes.	Description of Fruit.	Counts.	Net.
21st Oct., 1915	B.S.A.C. P.A.	2	Oranges	126	£1 13 4
		6	Valentia Late	150	5 0 0
		4	do.	150	2 19 1
		22	do.	176	18 5 6
		10	do.	200	8 6 10
		6	do.	216	5 0 1
					41 4 10
Telegrams, telephones, clearing, examining, dock labour, marking, despatching ...				£0 8 10	
Agency and guarantee				1 4 2	
Port of London Authority—Tilbury Docks: Charges for wharfage, loading and rail to depôt ..:				1 10 0	
					3 3 0
					£38 1 10

Referring to this consignment of Valentia Late oranges, the fruit brokers in London, through whose hands they passed, report :—"These (oranges), which were shipped in the cool chamber of the 'Balmoral Castle,' arrived in very fair condition, and were well packed, and have, we think, sold well. There was a little waste here and there, but nothing very bad, and we think that you can depend upon these selling well in Europe in future years." They also remark :—"These Valentia Lates were good, and arrived in better condition than most of the other marks we had on that steamer."

It will be seen that the average price for this parcel of fruit works out at 15s. 2d. per box, after deducting various charges in England. In normal times the cost of box, railage to coast and shipping charges to England amounts to 5s. approximately per box, so that the net return on this consignment would be about 10s. per box. I consider that this is a very satisfactory result, bearing in mind that at present our Rhodesian fruit has to travel by goods train to Cape Town, and in this particular case was in transit 12 days, as against Cape stuff with a very short rail journey, and that from the Transvaal, which is carried by perishable goods train. Further, it was not sold until two months after the time of picking, as will be seen from the dates given below. Fruit picked towards end of August, despatched from Umtali on 6th September, arrived Cape Town on 20th September, left Cape Town by "Balmoral Castle" on 25th September, and sold in London on 29th October. The net result clearly indicates that Rhodesian oranges of good quality and properly put up are well received on the European market.

It might be interesting to add the following further extracts from a report on another consignment of fruit this last season from Rhodesia to Europe, also an extract from the Board of Trade Journal on shipments of oranges generally from South Africa :—

> Extract from a report on another consignment of mixed oranges, *i.e.*, an assortment of varieties, sent Home during this last season for purpose of distribution to the troops :—
>
> "GRADING.—This was not well done; many

of the marked and scarred fruit should have been culled out for export.

(N.B.—This would have been done if this consignment had been intended for market.—A.G.T.)

"Sizing and Packing.—This was very well done. When removing the lid the package had a good saleable appearance, every orange in the different counts being uniform in size, and quite apparent that the top planks were nailed on under pressure, which fixes each fruit firmly in place.

"Condition.—The fruit was in excellent condition. We did not notice a single bad orange, shewing same to be of good keeping quality, taking into consideration the length of time in transit from Rhodesia to London, besides which certain parcels arriving by the same boat from the Cape Province were in a wasty state. The boxes were of good material, well put together, and though light in weight were strong. We did not see a single broken plank in the parcel."

Extract from Board of Trade Journal of 17th June, 1915 :—

"Orange Shipments.—The quality of oranges shipped to Europe from South Africa is improving annually, and it is now claimed that the fruit from the Transvaal arrives in London in a better condition than that from Italy and Spain. The belief is expressed that within five years the annual export of oranges from the Union will amount to over a million boxes."

Napier's Fodder or Elephant Grass.

(PENNISETUM PURPUREUM.)

By J. A. T. Walters, B.A., Assistant Agriculturist.

Since a previous article was written on the above subject (*Rhodesia Agricultural Journal*, August, 1913), great strides have been made in the distribution of Napier's fodder, and it seems likely that there will soon be but few farms in Southern Rhodesia on which a considerable patch of this grass is not found. There is a general consensus of opinion that in this plant we have a fodder of great value, available in a green form during the greater part of the year, and thriving in a considerable variety of soils. The remarks given below are largely a reprint of the previous article, together with additional notes on experiments that have been conducted on this grass since that time.

A chemical analysis of Napier's fodder made by the Agricultural Chemist in 1913 shewed it to be "comparable in feeding value to maize stalk roughage." Compared with sugar cane fodder, it proved to be twice as rich in protein and equally rich in carbohydrates. It contained, however, three times more woody fibre than sugar-cane, and not half as much juice, so that Napier's fodder would probably be less succulent and digestible than sugar cane. It was further pointed out that the ash of Napier's fodder constituted a very valuable manure. When these circumstances are remembered, and when it is further known that the plant will keep green in the usual climatic conditions of Rhodesia during the winter months, although without making much growth, it is evident that we have here a crop of first importance in the great problem of providing cattle with succulent winter feed.

A comparison of an analysis of Napier's fodder (Rhodesian) and green maize fodder as given in American returns is shewn below:—

	Napier's fodder.	Green maize fodder.
Water	61.81	79.0
Ether extract	0.29	0.5
Protein	2.92	1.7
Carbohydrates	17.29	12.0
Woody fibre	14.77	5.6
Ash	2.92	1.2

The above figures for Napier's fodder were obtained from plants cut in July. If cut in April or May, a larger percentage of water would be shewn, and this is desirable for the making of ensilage.

Under ordinary conditions the plant attains a height of 6 or 7 feet by the end of January. An experiment made, to test the weight of green fodder obtained when cut at this stage, shewed a yield of 12 tons per acre. A subsequent cutting a few months later, when the same plants had again reached a height of 7 feet, gave a yield of 15 tons of green fodder per acre. Great difficulty was experienced in converting this in dry hay, on account of the bulk and succulence of the stalks. It would, therefore, seem that, if cut in summer, it is best used as green fodder for stall-fed animals or as a constituent of the ensilage pit.

Trials conducted to ascertain the best period at which to cut this plant for ensilage, and at the same time to leave a sufficient period to provide a satisfactory fresh growth for winter feeding in July, gave the following results:—Cut on the 1st March, 3 feet of green growth had been made by the first week of July. When cut on the 1st April, $2\frac{1}{4}$ feet of growth only had been made, and when cut on the 1st May, 6 inches of growth only was obtained. It would, therefore, seem advisable to cut Napier's fodder for ensilage before the end of April, if green fodder for grazing is required in July. The weight per acre of fodder, by taking one cutting only at this period, has not been ascertained, but would probably not be less than 15 tons per acre, and in a favourable season might amount to 20 tons per acre in the case of plants of more than one year's growth. This could be ensiled either alone or with maize or velvet beans.

Napier's fodder can be propagated in three ways—by means of seed, by means of rooted slips, and by cuttings. The

Fig. 1.—Napier's Fodder, Botanical Experiment Station, Salisbury, October,

Fig. 2.—Napier's Fodder, Botanical Experiment Station, Salisbury. November, 1914

plant, if allowed to grow to maturity, forms seed heads about May, and produces seed fairly abundantly. Seeds should be sown thinly in a prepared bed as early as November, if water is available, otherwise in December or January with the rains. The young plants can be transplanted to their permanent positions when they are about 6 to 12 inches high. Perhaps the best and surest way to establish a plot of Napier's fodder is by using rooted slips. A root of this plant suckers very freely, and may be split up into a great many rooted slips. If planted out in their permanent positions they should be placed in rows 6 feet apart with 3 feet between each plant. After a few years' growth each plant will have spread to such an extent that it will be possible to remove the alternate plants so that they stand 6 feet apart each way. If this method is followed a large acreage can be established in a few years from a small beginning. Or again, the rooted slips may be planted 6 feet apart each way from the beginning, when about 1,200 will suffice for an acre.

If it is desired to grow the plant from cuttings, these should be taken when the plant is approaching maturity in May or June. Each cutting should be about 18 to 24 inches long, and should be placed slantwise in a prepared bed, about two-thirds of the cutting being under ground, or they may be laid flat in the ground about 3 inches below the surface. These cuttings should be kept shaded and moist, but not wet enough to rot them. They will be ready for transplanting the following January or February.

The ease with which Napier's fodder can be propagated is shewn by the following letter, which has been received from Mr. H. K. Bracewell, Ruia, Salisbury:—"It may be of interest to you to know that on 29th October, 1913, the Department gave me three slips (rooted) of Napier's fodder. These I put in the ground on 1st November. To shew how well the fodder has done, I give you some particulars:—

17th January, 1914—3 roots divided and made 188.
12th April, 1914—180 roots divided and made 1,050.
10th December, 1914—planted 5,000 slips.
5th January, 1915—sold 1,000 slips.
8th February, 1915—planted 1,250 slips.
27th February, 1915—sold 1,400 slips.

This is all grown on red sandy loam, and a large quantity will be ready to mix with mealies for my ensilage. Two roots which my wife placed in the garden on 17th April, 1914, she divided and planted out on 7th December, making 224."

This plant shews remarkable resistance, both to drought and to frost. There is also no doubt that it responds readily to irrigation. Provided irrigation can be practised, vigorous growth begins in October, especially in the case of plants that have been established more than one season. The amount of water required would seem to be small, and one of the principal values of the plant lies in the fact that it can be grown in dry situations where irrigation is out of the question. It is not advisable to plant out Napier's fodder in damp situations where water is inclined to stand. Under these conditions the plant wilts, and is best replaced by paspalum.

Our experiments would seem to indicate that under poor conditions, such as dry situations, red or sandy soil, and cold localities, Napier's fodder is to be preferred to sugar cane. In warmer localities, with rich soil where a rainfall of over 30 inches can be relied upon, sugar cane is likely to give equal or better results, both in weight of fodder and in food value. At Salisbury Napier's fodder has consistently shewn marked superiority over sugar cane, particularly in the ease with which rooted slips have been established, and the number of times cuttings have been obtained. The soil on which Napier's fodder has done so well at the Botanical Experiment Station is the prevailing red soil of Mashonaland.

Experiments have been conducted with this plant to test its suitability to granite sandy soils, at the Longila Experiment Farm, Matabeleland. Rooted slips were planted in February, 1913, on a dry ridge. The rainfall in the first season subsequent to planting was less than 12 inches. In spite of this, very few slips died, and most of them made remarkably vigorous growth by the 31st May, as Plate 4 will shew. By the 1915 season a considerable acreage had been planted out on the farm in close proximity to the railway line near Lochard Siding on a very dry belt, which presented a striking patch of green among the bare native vegetation during the winter months. The only situation which is not recommended for

Fig. 3.—Napier's Fodder. Botanical Experiment Station, Salisbury. Plant at full maturity.

Fig. 4.—Napier's Fodder on sandy soil at Longila Experiment Farm, Lochard, 31st May, 1913. Slips planted February, 1913.

Napier's fodder is a moist vlei or any locality where water is apt to lodge for any considerable period.

During the 1915-16 season applications for well over 60,000 roots have been received by the Department of Agriculture, and it is hoped to supply these in full as the season proceeds. Several farmers are now also in a position to sell rooted slips of Napier's fodder.

The Late Mr. H. W. St. Quintin.

It will be learned with widespread regret amongst the farmers of Southern Rhodesia that Mr. H. W. St. Quintin passed away on 24th January at Bulawayo Hospital, after a brief illness, ultimately necessitating a severe operation, from which, unfortunately, he failed to recover. For a number of years past Mr. St. Quintin has been a notable figure in our midst, and has been very prominent in all matters concerning the betterment of our cattle industry. His promising effort to make Salisbury a leading cattle market was frustrated by the re-appearance of Coast Fever on the commonage and surrounding farms, but for which there can be little doubt he would have succeeded in an endeavour which was not alone based on personal interest, but actuated largely by a desire to promote the public good. Similarly he was a great advocate of the importation of pure-bred cattle—and particularly from Australia—into Rhodesia. Latterly he was connected with the Veterinary Department, and resided at Que Que. His thorough knowledge of cattle and everything connected therewith, his sound common sense and wide experience, as well as his genial and courteous manner, endeared him to a wide circle of friends, by whom he will be long remembered and mourned.

Notes on Bee Keeping.

By Frederick Sworder.

From observation opinions have been expressed that a greater variety of trees have bloomed this spring than in previous seasons. This fact is thought to be due to the excessive rains of last year, which, while proving so disastrous to crops, has nevertheless been advantageous to the bee-keeper.

Although a locality may have been none too good for honey production, yet where a stock of the best breed of bees were in a condition to gather nectar freely, headed by a young and vigorous queen, the results should have been good, that is, judging from my own experience. One frame hive of bees of Transvaal strain has produced from bush bloom alone over 30 lbs. of extracted honey. This, being a record for my Rhodesian bee-keeping experiences of five years, is encouraging. It is impossible to think that had the bees been kept in a straw skep, or a box hive, they would have given such good results, but being located in a double-walled frame hive almost every assistance was given them; at the same time, the hive interior being easily accessible, no opportunity was lost in removing the good quality honey.

Knowing this stock from previous experience to be fair workers and quiet, I was led to furnish this particular hive with shallow frames in the super, *i.e.*, above the brood chamber, in consequence of the many unfinished specimens of 1 lb. sections hitherto produced by them, clearly proving that when conditions are favourable this method gives the better results, and I feel justified in discarding sections. For it is weight and quality of honey that constitute the bee-keeper's harvest.

The appliances used in extracting were a two-cage reversible honey extractor, a honey ripener fitted with wire strainer,

a keen-edged builder's small trowel answering admirably as an uncapping knife, being heated in a tin of water kept at boiling point over a primus stove, and a damp cloth. As fast as the frames of honey were uncapped, they were placed in the extractor, the cages containing the frames of honey often revolving at over four hundred revolutions per minute. This speed was necessary in order to throw out the very thick honey, yet in spite of this excessive speed the combs were uninjured, while only a trace of honey remained in the cells. All the frames having been passed through the machine, the resultant honey was then drawn off into the honey ripener, then strained through six thicknesses of butter muslin in order to remove small pieces of wax, pollen, etc., producing a clear sample. To permit of ripening, the honey was allowed to remain in the ripener for about five days, then drawn off into glass bottles, labelled and sold.

The following notes may be of interest (1915):—

Sept. 22.—Honey flow from bush bloom commenced. Gave 11 wired shallow frames furnished with starters only.

Oct. 22.—Removed 11 shallow frames partially sealed. Extracted same date, yielding 13 lbs. Time occupied by bees in building combs and filling with honey, 31 days.

Oct. 23.—Eleven shallow frames returned to hive to be refilled.

Oct. 28.—Bees well up among shallow frames, all cleaned up and repaired.

Nov. 5.—Removed the same 11 shallow frames partially sealed. Extracted the same date, yielding 11 lbs.

Nov. 6.—Returned the 11 shallow frames to hive.

Nov. 13.—Bees well up among these frames.

Nov. 16.—Removed 10 shallow frames partially sealed.

Nov. 22.—Extracted 10 shallow frames. Weight, 15 lbs. honey.

An experienced bee-keeper is fully aware that it is more difficult to secure good section honey than shallow frame honey for extracting purposes, and in most cases where he can afford it an extractor and honey ripener have been purchased. Section honey commands a rather higher price, and cannot be

adulterated, but the returns per hive are considerably less; this is due to the many nooks and corners which have to be negotiated in the sections by the bees at the time of storing, thus acting as hindrances to progress.

It is only when a crate fitted with drawn-out comb in sections and dividers is thoroughly examined and compared with a super containing shallow frames with drawn-out combs that the difference is so marked. For the speedy production of honey, the shallow frames must commend themselves to the observant bee-keeper. Comb foundation and new sections have to be bought and replaced every time a crate of completed sections is removed for sale. These items, although small, mount up. Section honey, therefore, costs more to produce. Likewise more skill and attention on the part of the bee-keeper has to be exercised, in order to place before consumers a gilt-edge article. Also it entails greater labour and loss of time on the bees' part, for the foundation has to be drawn out by them previous to honey being deposited therein. In point of fact, an uninviting chamber is given them to which they do not readily take, and it may mean that for a day or two the bees are idle at a period when every minute is of importance.

It may be argued that the same expenses of providing comb foundation are incurred with shallow frames. Admitted that they are—but only once, at the start; whereas with section honey the necessity for this outlay is continuous.

When first given to the bees, these wired shallow frames are fitted with comb foundation. In a few days it is drawn out or extended into cells by the workers, and when filled with honey these frames are removed from the hive. The cappings of the cells are shaved off with a hot knife; the whole is then passed through the honey extractor, being again returned to the hive with the combs uninjured and intact. With this system there is little loss of time or waste of energy by the bees; all that the workers have to do is to make a general clean up of the returned combs, then commence at once refilling, and if a good honey flow is still on, another 15 or 20 lbs. or more will be deposited therein in less than 14 days. With these self-same combs the operations connected with extracting can be continued until the supply of nectar has ceased; further, these combs do not deteriorate in the slightest degree, remain-

ing in good condition for years. It must be seen that inside the hive a saving in time and expense is practised to the highest degree, for when once started, no further outlay in purchasing foundation is needed with this system.

I am fully aware that the cost of suitable glass bottles in which to place the extracted honey is an item which must be added to the cost of production, yet this expense is more than compensated for by the extra weight of honey secured per hive, even although it may sell at a slightly lower price.

To induce bees to work to the best advantage in producing honey, various methods are adopted, but a great deal depends on the man, his adaptability, the race of bee, age of the queen, the condition of the stock of bees at the time of gathering, the source of nectar supply and the weather conditions. All agree that a good strong force of bees of the right working age and strain should be ready just before the expected supply of nectar, so that when the super is put on, the bees can start at once to take possession and commence preparations for the storing of honey just where and how one wishes them, but if the queen is not a good one, then failure stares one in the face.

Owing to the more direct route, bees take more readily to shallow frames than they do to sections. In some instances this may be due to the race of bee, for sections offer more hindrances than the former, and to overcome this shyness, the crate can be partially fitted with bait sections, *i.e.*, sections which have been drawn out the previous season, and containing a little honey, but not good enough for sale. In good districts where light-coloured honey is stored, it is the general practice to use sections, while in inferior localities the shallow frame plan for extracting purposes is adopted.

Inventors of new notions have put forward the idea that bees store their surplus honey equally well at the side of the brood chamber, and some bee-keepers still adhere to this plan; but as a rule they seldom fill and seal sections there placed as fast as when put above the natural cluster. In order to facilitate packing, and to secure uniform sealed sections, separators of either tin or wood have to be inserted between each row of sections, which although acting as guides to their work, are an annoyance to the bees.

Instances occur where the section crate is put on just a little too late at the time of the expected honey flow, thereby causing the brood chamber to become blocked up with honey, and unfortunately restricting the capacity of the queen. In a case of this kind she soon goes upstairs and commences depositing eggs in these sections, upsetting our calculations. Now, see what follows. So soon as this comb foundation is drawn out into cells, the bees begin carrying the surplus honey from the brood chamber to the super, it being natural for them to do this. The queen also, finding that the section crate is too cramped for her operations, retraces her steps, and re-commences her assigned work under natural conditions, but unfortunately she has left her mark above. This delay in putting on the section crate is a mistake on the part of the bee-keeper, and in taking it off, he will find several discoloured and unsaleable sections of honey.

By placing a sheet of excluder zinc on the brood frames, these losses can be overcome, for it prevents either the queen or drones from gaining access to the sections. It is seldom used by the writer for sections, yet is essential when working with shallow frames. This excluder is undoubtedly an obstacle to bees when storing honey in sections, and also restricts ventilation. This want of ventilation places the bees in an unnatural condition, *i.e.*, the hive interior becomes too warm for a considerable period in our summer months, thereby promoting that bugbear of all bee-keepers, viz., excessive swarming.

It is well known among Rhodesian bee-keepers that our bee is very prodigal in the use of propolis, more especially where the hives are being worked for the production of section honey. This brownish, sticky substance daubed into the crevices between sections is unsightly, and occupies much time in cleaning up almost every part of each recently completed section crate—in fact, it is a disagreeable job; besides, it deprives each section of its original whiteness, and not being so attractive, the price has to be lowered to effect a sale. Where hives are worked with shallow frames, a far less quantity is apparent.

It is the usual plan to allow the section crate to remain on the hive for a week or two, to enable the honey to be properly sealed and to become thoroughly ripened: it is then that an unnecessary amount of propolis seems to be deposited in in-

accessible places, and in scraping it off much patience on the part of the bee-keeper is required; and be he ever so careful he cannot avoid accidentally thrusting the blade of the knife into the comb honey, thereby rendering a few of the sections unfit for packing and for sale. Now, with a shallow frame such an accident matters little, for it soon finds its way into the honey extractor.

When a short honey flow is on, it often happens that the bees only fasten the comb to the top of the section. This indifferent class of work may often be due to the strain of bee to be found in any particular district, and for the safe transportation of comb honey the combs must be well secured to the wood on all four sides.

Where the bee-keeper is situated some miles from a township, to which in most cases his honey is sent by wagon, he must grade it carefully, and comply with the above instructions, otherwise there will be trouble.

Another argument in favour of extracted honey is the fact that it is far easier to pack bottles with less risk of damage than section honey. When we consider that 1 lb. of honey in a section is held in position by only half an ounce of wax, we can partially realise its frail nature; consequently it requires better packing. In spite of labels indicating its delicate character, section honey receives no greater care in handling than honey in bottles, even though every caution and forethought is exercised. When section honey breaks down during a rough journey, it is generally significant that the bee-keeper is unaware of the tender nature of goods he is dealing with. Only those who have had anything to do with the receipt of consignments of broken-down section honey can describe what a sticky job presents itself. The consignee advises the uninitiated bee-keeper of facts: result, unmentionable thoughts and words, with disappointment to both. The novice has certainly gained experience, but it has cost him something. He now ponders over this first loss, resolving to try another plan, and having read about extracted honey, seriously thinks of working his hives on the shallow frame principle, and thus avoid a repetition of failure.

(To be continued.)

The Government Forest Nursery, Salisbury.

The plot of ground on the north-east of Salisbury, now used as the Government forest nursery, was in the first instance, about ten years ago, laid out for general crop experiments, and at that time the older plantations of trees now standing were planted. After the general experimental work was transferred to other quarters, the ground was for several years not utilised, and it was only about four years ago that the present nursery work was started in earnest.

The officer now in charge, Mr. F. B. Willoughby, took over in March, 1913, and, beginning on humble lines and with limited means at his disposal, he has brought the nursery to the stage when it may be said that it is a successful and appreciated branch of the Department of Agriculture.

The encouragement of forestry and arboriculture is a very proper sphere of activity of Government, especially in a country where the general presence of trees clearly shews that the natural conditions are favourable, but the irony of fate has provided comparatively few indigenous trees capable of supplying the long, clean, straight timber required for building purposes, such as the deals of Northern Europe, the pines of North America, or the gums of Australia. It should be the ambition of every farmer to be in a position to provide himself from his timber lot with at least the rougher classes of building material and poles for the thousand and one uses of the farm. The beautifying of our rural homes by plantations, avenues and shrubberies is also surely a very legitimate aspiration, and the nursery endeavours to provide the material for these purposes at nominal cost, and to encourage this good object in every way possible.

Shelter belts to protect stock from the cold winter winds, and plantations on a larger scale to provide superior mining

Fig. 1.—Government Forest Nursery.

Fig. 2.—Eucalyptus Saligna, Government Forest Nursery.

timber, are also important considerations for the future welfare of the country.

It is the ambition of the Department to do all it can to foster arboriculture throughout the country, not only on the settlers' lands, but also in and around the towns, and to that end it lays itself out to supply as cheaply as possible both trees of economic value and ornamental trees and shrubs, in order that the homesteads may be made as beautiful and attractive as possible.

The immediate aim, then, of the nursery is to meet the steadily growing demand for young trees and shrubs throughout Rhodesia. It also encourages and lends aid to the adornment of public institutions, such as schools and hospitals, by the issue of suitable trees and shrubs for their grounds. To some extent, also, an endeavour is made to discover and test desirable exotics that are considered likely to acclimatise well in Rhodesia. Timber and ornamental trees of native origin are not neglected either, and several of these are amongst the more popular lines regularly sold by the nursery, notably the Violet Tree, Duranta, and the Bauhinias. It is probable that many more of our Rhodesian flora will be found worthy of cultivation. In this connection it is interesting to note that whilst most horticulturists in this country have found it extremely difficult to raise our wild bush trees from seed in the nursery, Mr. Willoughby says that he has had generally very good success with those he has tried. For instance, the Durantas and Violet Trees he is offering are all raised from local seed.

The nursery operations include several distinct sections, namely, general forestry and timber trees; ornamental trees; hedge plants and flowering shrubs. The last section was started on Mr. Willoughby's initiative, and we believe that no other Government nursery in South Africa is in a position to supply flowering shrubs.

It is unnecessary to enumerate all the varieties of stocks carried at the nursery, as the list of trees, etc., offered for sale will be found among the Departmental Notices at the end of this *Journal*. The principle is followed of supplying nothing that has not been proved a success, though buyers should bear

in mind the difficulty arising from the fact that trees which do well in one district may be quite unsuitable for another, so that some which fail at the nursery may flourish on the different soil of a farm near by, and *vice versa*. This limitation cannot be overcome. Purchasers and others interested are invited to inspect the nursery and see for themselves the trees and shrubs growing in place before making their selections. With same object in view, short rows of hedge plants are being planted, so that their suitability for various purposes may be observed. The actual plantations of forest trees are small, but sufficient as a preliminary guide to the general theory and practice of forestry. Nearly all the seeds used in the nursery for raising young trees are collected locally, so as to ensure the benefit of acclimatised plants.

The growing importance and usefulness of the forest nursery is well shewn by the figures for transplants sold. The number of transplants disposed of in 1914-15 was 150,000; for 1915-16 it will be over 200,000. It should be mentioned here that although formerly so transplants were sold at less than 8s. 4d. per 100, or 1d. each, the reduced scale has now been adopted whereby lots of 1,000 trees and upwards are sold at £3 per 1,000, and lots of 5,000 and over at £2 10s. per 1,000. These prices compare very favourably with prices asked in the Union for trees of similar size and quality.

The equipment of the forest nursery cannot be said to be on an extravagant scale. The out-buildings are of burnt bricks made on the spot, with thatched roofs. They include stable, native quarters, two cart sheds, mealie shed and an enclosure for sheltering a small rick of hay for the working animals. The last consists of three low brick walls covered by a high and steep grass roof carried on poles, and with the eaves coming well down to keep out rain. The officer in charge lives in quarters made throughout of grass and poles. The value of locally-grown gums and cypresses for rough farm buildings is well illustrated, for all roofs and uprights are composed of these woods, and they are seen to be very little subject to the ravages of borers. The illustrations accompanying this article shew:—Fig. I., the nursery with tins of transplants ready for delivery; Fig. II., a plantation of eucalyptus saligna.

A Source of Potash.

By J. M. Moubray, A.I.M.M.

It is not generally realised that there exists a vast source of potash in many countries, including Rhodesia, which has as yet been put to no use. This source is in the potash feldspar which is a constituent of many igneous rocks.

There are two common groups of feldspars, (1) that in which soda and (2) that in which potash predominates. The minerals are seldom found pure, but often with so small an admixture of foreign matter that for practical purposes they can be considered quite pure enough. A commercial process for the extraction of potash from potash feldspar has not yet been found. Potash feldspar has, however, been tried without any treatment except a mechanical one in which the mineral was reduced to a very fine powder. About the year 1860 ground potash feldspar was tried as a fertiliser in the United States. Some of the experiments are stated to have given good results, but little or no result was obtained from others, and the matter seems to have been dropped.

The potash in feldspar occurs as a bisilicate of alumina and potash, which is an extremely stable substance. The problem is to render this potash available quickly for plant food. A fairly pure potash feldspar contains some 14 per cent. of potash, which is a very high percentage when compared with the average commercial fertilisers. The usual occurrence of potash feldspar in bulk is in pegmatite veins, which are generally found in or near the granite. There are thousands of these veins, both large and small, throughout the country, but in many cases, however, the feldspar is other than the potash-bearing one. The feldspars are also a constituent of almost all igneous rocks, but in these are so mixed with other minerals that their separation would cost more than their value as a fertiliser.

The problem then is to locate a large pegmatite vein in which the potash feldspar occurs as large crystals or segregations. This is fairly easy in many parts of the country.

When travelling on the coast of Labrador some years ago, I was struck by the huge crystals of potash feldspar in some of the pegmatite veins, these crystals as a rule weighing many tons, and being so situated as to make the cost of quarrying small. Some of this feldspar was sent to London and there ground to an extremely fine powder. Portions were then sent to various experimental stations, and tests were made with it as a possible source of potash supply for plants. Among others some was sent to Dr. E. J. Russell at the Rothamstead Experimental Station. Dr. Russell reported that there was little or no result the first year, but the second year the results were decidedly promising. I have just heard from London that Dr. Russell has now asked for a further supply of the ground feldspar to make more extended trials with at Rothamstead. Dr. Russell is, I suppose, one of the foremost authorities on these matters in England, and his remarks should be of particular interest to users of potash fertiliser in Rhodesia, which country contains a large—in fact, I think we may say unlimited—supply of the raw material in that form.

It should not be impossible to make the experiment locally. There are many mines which reduce their ore to a slime in order to treat it, and this would be an ideal method of reducing the feldspar. It could be easily arranged to put some tons of feldspar through many of our local plants at a cost of a few shillings per ton, to run the resulting slime into a separate pit, and when the slime had dried out, to cart it away and spread it on the land. The cost of quarrying, carting and crushing would be in most cases less than half the cost, unit for unit, of the imported potash fertiliser. Against this one would, as far as experiments point, have to wait for a series of years for the result, which would be gradual. We are, however, in this country mostly farming our own land, so that the disadvantage is not so great as it appears, or would be in the case of a tenant with a short lease.

I write these few notes in the hope that someone favourably situated as regards local conditions may give the feldspar a trial. As many tobacco farms are situated near the granite, and as tobacco requires a considerable quantity of potash, it is possible that we have at our doors a material that under certain conditions can be adapted to our use, instead of importing from abroad the same article at a very much greater cost.

Classification of Clouds.

EXTRACT FROM "ELEMENTARY METEOROLOGY."

By Robert H. Scott, M.A., F.R.S.

Clouds were first systematically studied by Luke Howard, and his classification of them has met with general acceptance hitherto, no attempt to re-model it having been received with much favour. Howard recognised three primary, with four compound, types, the latter being the combination of the simple forms. The primary types are:—

A. *Cirrus.*—The mare's-tail cloud.
B. *Stratus.*—The ground fog.
C. *Cumulus.*—The wool-pack cloud.

The compound types are:—

D. By the combination of A and B we get the *cirro-stratus.*
E. By the combination of A and C we get the *cirro-cumulus.*
F. By the combination of B and C we get the *cumulo-stratus.*
G. By the combination of all three primary types we get the *cumulo-cirro-stratus,* or *nimbus,* the rain-cloud.

In order to consider these systematically, we shall classify them under the two categories of upper and lower clouds. The types which belong to the upper series are A, D and E.

A. *Cirrus* is the streaky cloud, like a feather or spray, which appears at a very great height in the atmosphere, far above the highest mountain peaks. It is generally a sign of wind. Cirrus generally moves in a direction differing from that of the wind at the surface of the earth, but its motion often appears to be so slow that there is a great difficulty in determining it without watching for a considerable time, so as to mark the motion of the cloud over some fixed object. However, the importance of the observation makes it highly desirable that particular attention should be devoted to it. From

investigations on this point most interesting conclusions have been drawn as to the movements of the atmosphere in regions which, from their height, are quite inaccessible to any other class of observation.

D. *Cirro-stratus* is usually generated by increased condensation in cirrus already formed, which consequently sinks to a lower level. The first sign of a change of weather from a clear sky is usually the development of cirrus. This gradually spreads its network over the sky; the fibres then grow coarser, and at last coalesce to form a grey film. At times the ribs of cirro-stratus stretch from one point of the horizon to the opposite point, the lines, owing to the effect of perspective, appearing widest apart at the zenith, and converging on either side like the streaks of a boat. This phenomenon is very common, and is known in some parts as a "Noah's Ark" in the clouds. It is an almost unfailing sign of rain. When bad weather is approaching, the cirro-stratus cloud increases in compactness and density, and sinks to a lower level, at times entirely intercepting the direct rays of the sun and moon, and presenting the appearance of a uniform sheet overspreading the sky.

It is in cirro-stratus that the optical phenomena halos mock suns and mock moons are manifested, and these prove that cirro-stratus is an ice-cloud. The more common appearances of *coronæ*, rings or burrs round the moon, are produced by droplets of water, and appear when any thin cloud crosses the moon.

E. *Cirro-cumulus* is also a high cloud, though usually lying at a lower level than the cirrus, from which it differs in being more globular in form, and consisting of small detached rounded masses, like a flock of sheep lying down, or like the markings of a mackerel, whence the name "mackerel sky."

Before leaving the subject of upper clouds altogether, it should be remarked that as clouds are seen at all levels between the highest cirrus and the lowest stratus, it is often difficult to determine whether a particular sheet or layer of cloud belongs to the upper or lower system. In such cases the observer will be greatly assisted by remembering how the clouds have assumed the shapes he sees, whether by the gradual subsidence of the higher forms, or by the ascent of the lower clouds.

We now come to the lower clouds.

B. *Stratus* is a form of cloud about which there has been a persistent misconception, as there has been a tendency to give that name to a very thin layer of cloud seen on the horizon. Howard's definition of stratus is "a widely extended continuous horizontal sheet increasing from below upward." It is a sheet or layer of cloud of uniform thickness generally. It has but little variety of light and shade, and belongs essentially to the lower regions of the atmosphere, so much so that Howard speaks of it as a "ground fog," the cloudy formation which spreads over low grounds in the evening, and disappears as soon as the temperature rises in the morning.

Stratus is generally a fine-weather cloud, appearing during the evenings and mornings of the brightest days. At times it overspreads the whole sky in the form of a low, gloomy, foggy canopy, the atmosphere being more or less foggy under it. All low detached clouds which look like a piece of lifted fog, and are not in any way consolidated into a definite form, are stratus.

C. *Cumulus* is a very common form of cloud, and frequently appears in summer. It has a rounded or conical shape, and often springs from a horizontal base. Hence its name of "wool-pack cloud." It is produced by an ascending current of air, of which the vapour is rapidly condensed, and has a tendency to collect in rudely globular masses, such as are formed by the steam escaping from a locomotive on a frosty day.

F. *Cumulo-stratus* is defined by Howard to be "the cirro-stratus blended with the cumulus, and either appearing intermixed with heaps of the latter, or super-adding a widespread structure to its base." This is also a common form of cloud. It is the cumulus as it were changing into a nimbus. It is dark and flat at its base, and it is traversed by horizontal lines of dark cloud. It not unfrequently covers the whole sky.

It need scarcely be stated that all these appearances of horizontal bases to clouds indicate the presence of strata of air of different temperatures. If the lower stratum be at a higher temperature than the upper, it can contain more moisture, and accordingly can dissolve any portions of the cloud which descend into it, so that the cumulus cloud will appear to stand on the plane of separation of the two layers.

In some cases the phenomenon is noticed of a cumulus cloud apparently reversed, a globular formation being developed on its under, instead of its upper surface. This cloud is called in the Orkneys the "pocky cloud," and it is a well-known sign of storm. In the case of the formation of this cloud it is probable that a warmer and damper stratum is superposed on a colder one, so that there is a condition of unstable equilibrium likely to produce a storm.

G. *Cumulo-cirro-stratus*; also called *nimbus*. This is the rain-cloud, defined as "a cloud or system of clouds from which rain is falling." Whilst on the horizon, or as it advances towards the observer, its front frequently presents a marked outline, like that of a very heavy cumulo-stratus with rain falling from it and with some cirrus above. When it has covered the whole sky it is so concealed by falling rain that it generally assumes a uniform dark appearance. It is, however, evident that as rain may fall from clouds of various types, the description of nimbus as a compound cloud leaves very much to be desired.

Equal in importance to observations of the *form* of the clouds are observations of their *motion*. The clouds of the lower stratum usually move in the same direction as the wind felt on the surface of the earth, at least in flat countries. Among mountains, of course, the surface wind is affected by local eddies. At all times, however, even the lowest clouds move far more rapidly than the wind close to the ground. As regards the upper clouds the case is widely different, for their motion almost invariably makes an angle with that of the wind below, and by the study of this motion much light has been thrown on the laws which govern atmospherical currents.

It is also important to observe the *amount* of cloud visible in the sky at any time. This is estimated according to a scale 0—10, 0 being a clear blue sky, and 10 a sky entirely overcast. Such an estimation is more or less unsatisfactory, as it is entirely relative to the position of the observer, for a layer of stratus which, if it were in the zenith, would cover a considerable proportion of the sky, only presents to the eye a thin section when it is seen on the horizon. Fog, of course, gives the appearance of an overcast sky (10 of the scale), but it is only to be entered as 10 when the observer is entirely enveloped in it and cannot see any blue sky.

Fig. 1.—Cattle Dipping Tank, Ruia Estate.

Fig. 2.—Cattle Dipping Tank, Ruia Estate.

Correspondence.

DIPPING TANK.

To the Editor,

Rhodesia Agricultural Journal.

Sir,

I am enclosing two negatives of cattle entering dip and coming out of same, as I thought you might consider them of sufficient interest to place in the *Journal.*

You will possibly notice this dip is constructed rather differently from some. I can thoroughly recommend the ledge which you will notice (see Fig. I.) is on the inner edge of the dip, extending some distance from the point of entry. This prevents a large waste of dip as the animals enter it.

The walls are 4½ inches wide, and it was made with 16½ casks of cement. There are no bricks whatever used in construction of same. The entrance is slightly thicker, having 6 inches width of concrete, and six narrow gauge rails are built into the concrete, which makes the race much stronger in case of any trouble with cattle going into the dip.

I can recommend all farmers who put their cattle through a new tank to mix 10 lbs. bitter aloes in the tank before putting any dip into it, and drive the cattle through. This minimises the chance of cattle drinking any dip afterwards, as if they get a mouthful of bitter aloes, their own sense tells them to close their mouths.

This tank was erected in October, 1913, and no repairs have been done to it in any shape or form.

Yours, etc,.

H. K. BRACEWELL.

Ruia Estate,
December, 1915.

Departmental Correspondence.

Under this heading we publish correspondence between farmers and the technical officers attached to the Department of Agriculture, containing information which may be of interest and assistance to our readers.

CITRUS BUDWOOD.

In reply to an enquiry as to the proper method of cutting and packing budwood of citrus, the Citrus Adviser writes:—Budsticks should be taken from well matured wood of not more than one season's growth. The best wood is usually of the last one or two growths matured just before required for cutting. Round wood is preferable and easier to handle than angled growths.

Budwood should not be taken from young non-bearing trees; if possible, older trees should be selected for this purpose, those that have been producing good crops of their particular type, and using no scions from stunted trees or those that have produced fruit of inferior quality. It is therefore advisable to mark and note certain trees from which to select budwood for propagation purposes.

Great care should be taken that all varieties are carefully labelled and shewn accordingly on the nursery map, which is a *sine qua non* in large nurseries, to prevent the occurrence of mistakes and consequent mixing of varieties. I would call your particular attention to this matter, as I am under the impression this has been neglected in certain existing nurseries.

Fresh shoots *without wet packing* can be transported very long distances in tight tin or other boxes, by sealing both ends of each stick with melted grafting wax or candle grease, to prevent drying out.

CITRUS EXPORT.

The Manager of the Estates Department (B.S.A. Co.) in correspondence on 1st September, 1915, with the Government Citrus Adviser on the above subject, says:—With reference to the citrus fruit exported to Europe in 1914 . . . we sent Navel oranges from Mazoe in July, from the Premier Estate in August, and Joppa and Valentia Late oranges from the Premier Estate in September.

This year we commenced picking Valentia Late oranges on 30th August, and they therefore will not be sent Home till the end of the first week in September, or arrive in London till about the first week in October.

The Navels from Mazoe were picked last year early in June. This year they were not railed from Mazoe till August. I call your attention to this, as possibly it will be better another season to pick the fruit a little earlier. I shall be glad if you will give me your opinion.

The Citrus Adviser in reply (extracts):—These reports are very interesting, and I gather the Navel oranges from Mazoe Estate were not quite so coarse in 1914 as they were this year, possibly on account of a lesser rainfall, or rather the rain being distributed over a longer period with more spells of sunshine than occurred this last wet season, which was abnormal, and affected the trees and fruit, more particularly following a season of drought when no irrigation had been applied; a very light crop indeed was the result. A really heavy crop would have tamed the fruit down from its too vigorous growth.

I note the 1914 Navels were spoken of as being somewhat flavourless and raggy, which is quite usual off young trees on strong soil; this want of flavour and coarseness will be overcome as the trees begin to bear full crops, and receive closer attention than they have in the past in the way of fertilising, irrigating, cultivating, etc., at the right time.

I am inclined to think the Navels from Mazoe Estate this year would have received a favourable reception oversea had they been picked a month or six weeks earlier than actually occurred, but you will remember this was delayed on account of the grader not arriving. The fruit would, however, have been in better shipping condition when it was finally picked, had the trees received one or more good irrigations from, say, April to July.

I might remark here that it is a pretty generally accepted fact that Washington Navel oranges require a greater quantity of water than most other varieties to bring them to full maturity, and I have found it to be so in the Transvaal, while, from observations during the last year, this rule holds good here in Rhodesia.

With further reference to these Navels from Mazoe this year, I did not anticipate there being no accommodation in cool chambers on the boats, as we had been promised space for up to 50 boxes per week. I was aware that they were too ripe to carry oversea in ventilated holds. With regard to the 10 per cent. wasty fruit in the two boxes opened at Capetown by the Government Fruit Inspector, I think the probability is that the damage was done in nailing up the boxes at this end with the clumsy contrivance used for this purpose, on top of fruit already over-ripe. This might not have occurred, even with such an arrangement for pressing, had the fruit been firmer.

I have in mind a simple press that could be set into the walls of your proposed new temporary packing sheds, that would do satisfactory work.

With reference to the Valentia Lates despatched from Premier Estate in August last year, I note that Messrs. Perkin & Adamson describe them as being "lemony" in flavour. This was quite likely due to their having been picked before they were ripe. In one report I note it is suggested that the lemon flavour in Rhodesian oranges might be due to the fact that they are worked on lemon stocks. On this point I would remark that practically every budded orange tree planted in commercial groves in the Union of South Africa is worked on identically the same stock as is used in this Territory. This variety (Valentia Late) has a habit of apparently being ripe quite early in the season, although they are not usually actually ready for shipment until about early September. I may remark that in the Transvaal I have kept this variety on the trees in good going order until early November and later, and when picked the fruit has been in excellent condition. I would point out that the great advantage of the Valentia Late orange is its capability of hanging late on the trees, so that it can be shipped to Europe to arrive there at a time of year when

oranges are in great demand, *i.e.*, Christmas time, and moreover can capture the market in competition with the unripe specimens of fruit arriving from the Mediterranean; and it is an accepted fact that oranges on the English and American markets around Christmas time are notoriously sour. The end of January usually sees the first sweet European or American oranges. You will remember when I was at Premier Estate early in August I then suggested that the block of Valentia Lates then just preparing to bloom, and holding up a fair crop of very nice fruit, should be irrigated again at once —the previous irrigation, I believe, had been early in July— so as to give all the vitality possible to the trees for setting the young fruit, and keeping the old crop in good order to be picked about three weeks from date of irrigation; the fertiliser to be distributed at first cultivation after this irrigation. A further irrigation would probably be required about mid-September, in order to keep the young fruit growing without any check. Should no soaking rains occur before the end of October, an application of water would then be necessary, and I would say, further, that should any long spells of drought occur during the wet season (summer), sufficient to make the trees shew signs of distress, irrigation should be resorted to without delay, otherwise the fruit is liable to receive a check sufficient to make it woody, from the effects of which it will not recover, and will not materialise as first-class fruit. After the wet season is over, it is sometimes advisable, in fact necessary, to irrigate orange trees bearing a crop of fruit up to within, say, three weeks of picking. As a matter of fact, a bearing orange tree should never be allowed to receive the slightest check from want of moisture the whole year round.

I do not wish to convey the idea that the ground should be kept in a state of swamp, far from it; but I do say it should never be allowed to get really dry.

These remarks apply to all varieties of oranges suitable for export oversea.

Regarding the consignments from Marandellas and Premier Estates, this fruit went forward in good, firm, sound condition, having been picked at the proper stage for oversea markets.

The Agricultural Outlook.

The distribution of rain this season, up to time of going to press, has been uneven. Mashonaland as a whole has received an abundant supply, and prospects both for stock and crops are excellent. In the Midlands, however, although stock are still in prime condition, considerably more rain is needed to bring the veld on sufficiently to carry the flocks and herds successfully through next winter. Crops of all kinds, including tobacco, are well forward, so that, if normal rains continue for the next two months, a good harvest may be anticipated.

Matabeleland has not been so fortunate. There the rains have been insufficient and irregular, with the result that the grass is backward and the outlook for stock in the coming winter unsatisfactory. Also, owing to the lateness and uneven incidence of the rain, many farmers have had to re-plant, and some of the crops will be too late to secure good or average yields. Stock are reported to be in good condition and free from disease.

Veterinary Report.

November, 1915.

AFRICAN COAST FEVER.

Salisbury District.—No fresh outbreaks. At the Borrowdale infected centre 3 head became infected and were destroyed. During the month 63 head were slaughtered; *post-mortem* inspection shewed liver fluke in a large number of cases.

Mazoe District.—No fresh outbreaks and no case of disease on the infected centre at Mazoe.

Umtali District.—The cattle in the Penhalonga Valley continue healthy.

Melsetter District.—Fresh outbreaks occurred on the farms Grassflats and Ostend. The following mortality occurred during the month:—Randfontein, 1 head; Wolvedraai, 1 head; Landsdown, 5 head; Houtberg, 1 head; Joppa, 1 head; Rookwood, 15 head; Roslyn, 22 head; Cecilton, 1 head; Woodstock, 5 head; Grassflats, 1 head; Ostend, 2 head; total, 55 head.

MALLEIN TEST.

The following animals were tested with mallein on importation, with negative results:—Horses, 6; mules, 37; donkeys, 53.

TUBERCULIN TEST.

One bull and two heifers from the United Kingdom were tested with tuberculin on arrival, with negative results.

IMPORTATIONS.

In addition to the above the following animals were imported:—Heifers, 110; bulls, 20; sheep and goats, 2,366; pigs, 2.

CATTLE REGULATIONS.

In the Magistrate's Court, Umtali, a conviction was obtained for the removal of 14 head of cattle from Charter district to Umtali without a permit, and a fine of £80 or eighteen months' imprisonment was imposed.

December, 1915.

AFRICAN COAST FEVER.

Salisbury District.—No fresh outbreaks. The following mortality occurred at existing centres of infection:—Borrowdale, 1; Greystone, 2. At Borrowdale 30 head were slaughtered for meat.

Umtali District.—The cattle in the Penhalonga Valley continue free from disease.

Melsetter District.—A fresh outbreak occurred on the farm Diepfontein in the northern section of the district. The cattle were successfully removed to clean veld through a temperature camp, and are dipped every three days. Under these favourable conditions a heavy mortality is not anticipated. At the other infected centres the following mortality occurred:—Wolvedraai, 3 head; Houtberg, 2 head; Randfontein, 2 head; Joppa, 2 head; Roslyn, 38 head; Rookwood, 2 head; Cecilton, 4 head; total, 53 head.

The good results of dipping are already apparent. There are 25 farms infected, and on seven of these only did cases of disease occur during the month, and the mortality is small if the farm Roslyn is excluded; in this case the disease had become firmly established before the dipping tank was completed.

Attention is directed to the energy displayed in the erection of dipping tanks in this district. There are at present 69 tanks in working order and several in course of construction. Over 60 of these have been erected during the last few months.

MORTALITY IN CATTLE.

On the farm Tilbury in Melsetter district a large number of cattle became ill, and a considerable mortality—13 head to the end of the month—ensued. Microscopic examination of blood and other preparations failed to shew lesions of Coast Fever or other disease. *Post-mortem* examinations point to poisoning of a corrosive irritant nature, and analyses are being made by the Government Chemist, which it is hoped will determine the cause of the mortality.

Mortality in Calves.—A heavy mortality in calves is reported from two farms in the Que Que district. The matter is now being investigated by the Assistant Chief Veterinary Surgeon and the local Veterinary Officer.

MALLEIN TEST.

The following animals were tested with mallein on importation, with negative results:—Horses, 10; mules, 9; donkeys, 140.

IMPORTATIONS.

In addition to the above the following animals were imported:—Heifers, 69; bulls, 4; sheep and goats, 2,358; pigs, 40.

J. M. SINCLAIR,
Chief Veterinary Surgeon.

Farming Calendar.

February.

BEE-KEEPING.

In districts where honey is still coming in from veld flowers, it should be removed before the delicate whiteness of the combs becomes soiled by the travel of the bees. The end of the honey crop can be assured by the presence of a few robbers lurking about the hives. Should there be a short supply of nectar, it may be necessary to feed rapidly inside the hive. Where stocks are queenless, they can be united by dredging both lots with household flour. Grade and dispose of honey.

CITRUS FRUITS.

The notes on planting still apply, if trees are still planted this month, an operation which, however, it is not desirable to leave so late. Trees planted after about the end of January may only get established when it is too late that season for them to commence growth, the consequence being that what growth there is is still sappy at the approach of the cold weather and so stands a chance of being nipped. In such case the tree would have been better left in the nursery row to be lifted and transplanted into the orchard the following spring.

By the end of February or early March the cover crop should be ready to plough into the orchard, with the possibility of sufficient rains after it is done to assist in rotting the plants in the soil. A continuous watch should be kept for insect pests, and fumigation or spraying undertaken immediately any pest is observed. If no cover crop has been sown, the orchard should be kept in a good state of cultivation, and not allowed to be overrun with grass and weeds. Destroy all fruit infested with Natal codling moth by burning or burying deeply. Some success has been obtained by smearing the first oranges that begin to turn colour with tanglefoot, as these are the first fruits to be attacked by the pest. Do not allow the fruit to fall to the ground before destroying it, but pick all affected fruit as soon as it is observed.

CROPS.

During this month the farmer's energies will be concentrated on keeping the lands thoroughly clean, and if this is done effectively now, no further serious damage from weeds need be feared. Most summer crops will be in the ground. Maize for ensilage may still be sown, also catch crops of buck-wheat and teff for hay and seed. The main maize crop should be cleared of suckers, which can be fed to stock. The most vigorous plants should be marked for seed selection by cutting the stalk above the cob, and the date of tasselling should be noted both in the main crop and the ensilage crop. In case of excessive moisture, the use of the wing shovel plough is strongly recommended. Monkey nuts should not be cultivated after the period of flowering, which is usually early in February. Hay-making should start in February if weather conditions allow. The sooner the veld is cut for hay the better the product obtained. Land for winter crops of oats and wheat should now be got ready as weather conditions permit. Napier's fodder slips planted early in the season can now be divided.

DECIDUOUS TREES.

This is the time to carry out summer pruning, after harvesting the crop, and when the flow of sap begins to become sluggish.

ENTOMOLOGICAL.

Maize.—The first brood of the stalk borer matures this month, and the young of the second brood may be found amongst the younger leaves. Weeds should be kept down (see March). Certain caterpillars are sometimes troublesome. See "Some Insect Pests of Maize," *Agricultural Journal*, June, 1912, and "Some Injurious Caterpillars," *Agricultural Journal*, February, 1915.

Tobacco.—Stem borer, leaf miner and budworms are the chief pests likely to be troublesome. See "Handbook of Tobacco Culture," published by the Department of Agriculture, pp. 71-99.

Potato.—Ladybirds and tuber moth may call for attention; the latter, when very bad, sometimes causes considerable wilting of the crop besides attacking the tubers. See *Agricultural Journal*, October, 1913, and February, 1910.

Cabbage Family.—All members of the family are liable to the attack of sawfly and webworm during February. See *Agricultural Journal*, February, 1914; April, 1910; and April, 1911.

Beans and Cowpeas.—These suffer chiefly from stem maggot and blister beetles which destroy the blossoms. The latter must be collected by hand. The former is dealt with in the number of this *Journal* for April, 1913.

Melon Family.—The most important pest is the melon fly, which "stings" the fruit of all species of gourds. At present no remedy is known except collecting and destroying the infested fruit early in the season. Aphis on the leaves and shoots may be destroyed by careful spraying with tobacco and soap wash or paraffin emulsion.

Mangolds and Beets.—These are frequently defoliated by caterpillars. Spray with an arsenical wash.

Citrus Trees.—The chief pest requiring attention during February is citrus codling. The infested fruit should be gathered and destroyed regularly. The fruit is also apt to be attacked by large fruit-piercing moths, for which unfortunately no remedy is known.

Deciduous Trees.—Apple, pear and late peaches suffer chiefly from fruit moths which puncture the fruit. No remedy is known except netting the trees.

Fig.—The fruit is liable to the attack of the fig weevil. Infested fruit and all wild figs near the trees should be collected and destroyed. The borer in the stem may be killed by inserting a little carbon disulphide into the burrow and sealing it up.

Castor Oil.—Two-year-old plants which contain borer should be cut down and burnt. See *Agricultural Journal*, October, 1912.

FLOWER GARDEN.

During this month the flower garden is gradually approaching perfection, and nearly all plants are in bloom. If these are constantly plucked the yield will be increased, and except where required for seed, all flowers should be removed as they fade, for seeding shortens the life of many plants. All runners and creepers should have constant attention, and be tied up and trained. Dahlias in more exposed positions should be carefully tied to their stakes, as they now become top-heavy with the weight of their blooms. Palms in the house and conservatory will benefit much if occasionally put out in the rain.

FORESTRY.

Complete planting out of ever-greens. Sow in nursery seeds of slow growing species such as cypress, pines, etc. All planting should be completed this month, in the early part if possible.

GENERAL.

This is a busy time for the farmer. Weeds will be very much in evidence and difficulty will be experienced in keeping them under. Stock will have fully recovered their condition, but ticks will be troublesome. The dipping tanks must be fully utilised now.

POULTRY.

Do not attempt to make your birds lay during the moult, and, if possible, keep them dry. As the feathers are being cast, food of a cooling rather than a stimulating nature should be given. Do not have any superfluous fat on your moulting birds, or they will probably stick in the moult. Give all birds a plentiful supply of green food. Keep your late hatched birds growing as long as possible. The early hatched pullets should be giving a good supply of eggs now. Do not forget the dust bath.

STOCK.

Cattle.—Grass will now be at its best, and no anxiety need be felt about feed. In the case of milking cows which have been fed during the earlier rainy months, a little crushed and soaked mealies, or something similar, may still be given at milking, if only to bring the cows quietly to their places. The importance of a clean, light, airy and well-drained shelter for calves cannot be over-estimated. Calves up to three or four months old do not require a great deal of exercise, and on wet days are better left in a dry shed with a little sweet hay. A few hours' exercise on bright days in short grass is all they need. Vigilance in keeping down ticks must not be relaxed. These remarks apply specially to milking herds and to cattle that are kraaled. Cattle running at large need little attention beyond dipping, and if the calves are not desired from November to March, the bulls must now be taken out of the herd.

Sheep.—Vleis and low-lying ground must be avoided. Sheds should be airy, dry and clean. If grass seeds are troublesome to woolled sheep, an area should be mown for them, or when rain begins to slacken, they may be shorn. If wire worm is troublesome, dose and move to fresh grazing and kraals.

TOBACCO.

The curing should be well on now, if any tobacco was transplanted in November. This will be a busy season until the curing is finished; however, one or two good plough boys with all the spare oxen should be breaking land for the next season's crop, turning under all vegetable matter.

VEGETABLE GARDEN.

Potatoes should receive attention and be carefully ridged up, and care taken that the stalks are not buried. Seeds for winter crops should be sown, such as beet, Brussels sprouts, cabbage, carrots, beans, peas, onions, turnips, tomatoes, etc. Vegetables planted out during this month might be placed a little closer together than usual, as watering may have to be resorted to before they mature.

VETERINARY.

This is a bad month for horsesickness. Redwater and gallsickness in cattle occur all the year round, but the summer months, when ticks are active, is the worst time. Three-day sickness in cattle may now be looked for. Trypanosomiasis is a summer disease. Blue tongue is somewhat similar to horsesickness, and February is a bad month. The disease has so far only been found in imported merinos, but it spreads from these to indigenous sheep. After twelve months in the Territory, sheep do not contract the disease. The first symptom is laminitis, the second a protruding blue tongue. White scour may be prevalent now, but dipping is eradicating the disease.

WEATHER.

This is generally the wettest month of the year, with marked differences of from 10 inches to 15 inches on the eastern mountain ranges, 7½ inches over Mashonaland, 4 inches to 6 inches in Matabeleland, and least, but still some, rains in the Limpopo Valley. The rains may be expected to decrease in intensity after the middle of the month if the season is normal.

March.

BEE-KEEPING.

The wax moth will be unusually busy this month. Strong stocks of bees tend to obviate this pest. Where the recent heavy rains have penetrated the weak parts of hive roofs and caused dampness among the clothing, the quilts should be taken off and thoroughly dried in the sun. Where robbers are seen, contract the entrances of hives. Store honey in a dry, warm cupboard for future use.

CITRUS FRUITS.

Two thorough sprayings about this season, when the rains are usually practically over, at an interval of about two weeks, will often obviate the necessity for further work against scale insects until the beginning of the next wet season. If not already done, orchards should be ploughed and cross-ploughed and worked up into a really good surface, so that the cultivators can be kept going, say, every two weeks until it is necessary to irrigate, after which cultivation should still be continued. If March prove a dry month, orange trees holding up a crop of fruit will probably require irrigation, but under normal weather conditions it should not be necessary. The same remarks apply as last month with regard to fruit moths. About the end of this month fall budding can be taken in hand, that is the insertion of buds that are intended to remain dormant until spring.

CROPS.

For general cultural treatment, see February notes. Rape and kale for autumn feeding may be sown during the latter half of this month. Haymaking can continue. Land for winter crops of oats and wheat should now be ready. The division of Napier's fodder slips can be continued up to the end of this month.

ENTOMOLOGICAL.

Maize.—The stalk borers of the second brood will be found freely in the stalks, but nothing can be done at this stage. Caterpillars may attack the crop during this month, usually *as a sequence to cultivation after the weeds have been allowed to get too far ahead.* The caterpillars attack the crops on account of their food being suddenly destroyed. See "Some Insect Pests of Maize," *Agricultural Journal*, June, 1912; and "Some Injurious Caterpillars," *Agricultural Journal*, February, 1915.

Tobacco.—The crop will by this time mostly have outgrown insect injury, but any plants still infested with stem borer should be removed and burned. Leaf miner will still be in evidence, and budworms may put in an appearance. See "Handbook of Tobacco Culture," published by the Agricultural Department, pp. 71-90.

Potato.—Ladybirds may still be injurious. See *Agricultural Journal*, October, 1913. Careful hilling should be attended to on account of the tuber moth. See *Agricultural Journal*, February, 1910.

Cabbage Family.—Sawfly. See *Agricultural Journal*, April, 1910; and April, 1911. The fly will probably be less injurious by this time. Cabbage louse may be on the increase. Very thorough spraying with tobacco wash and soap is of value when the plants are young.

Beans and Cowpeas.—The most obvious enemeis are the blister beetles, which destroy the blossoms. These can only be destroyed by hand. Stem maggot continues injurious, causing dropping of leaves on the larger plants, but little can be done at this stage.

Melon Family.—Plants of this family are subject to the attack of melon fly and aphis. Careful spraying with tobacco wash or paraffin emulsion is of value against the latter.

Sweet Potato.—Hawk moth caterpillars occasionally appear in countless thousands and defoliate the crop. Immediate spraying with an arsenical wash is called for when the insects first appear. See *Agricultural Journal*, June, 1912.

Citrus Trees.—Attention should constantly be given to the systematic collection and destruction of infested fruit to keep down the citrus codling. Large fruit-piercing moths may attack the fruit during this month (see under February).

Deciduous Trees.—But little damage from insects is likely to occur to these fruits during March.

Fig.—Fig weevil still calls for attention in collecting and destroying the infested fruit.

Castor Oil.—See under February.

FLOWER GARDEN.

During this month the garden should be seen at its perfection, and, owing to our rains, requires a great deal of attention in order to keep the soil free from weeds and caking. Drainage should also be looked to, in order to avoid plants being swamped or washed away. Dahlias and carnations should now be in their heaviest bloom, and will require tying up, and the dying blooms should be removed, in order to prolong their flowering period. Plants for winter flowering should now be coming on and planted out. Cuttings of carnations may now be made, and should be picked from the choicest plants, and taken from stems which have borne the finest blooms. The cuttings should be placed in boxes containing sand, and kept in a moist condition in a warm position sheltered from the winds. These should be ready for planting out in about two months, and bloom in three. Carnations, verbena, antirrhinum, penstemon, pansy, dianthus, phlox, calliopsis and escholtzia may be sown for early blooming next spring.

FORESTRY.

If necessary, cultivate between the rows of trees planted out in the previous months. Plough any fire lines that are necessary and break up any new ground that will be required for next season's planting. Remember that the roots of trees penetrate deeply into the ground, and therefore plough as deeply as possible. Where black wattle thrives, sow seed this month, after well soaking.

GENERAL.

At this time the condition of stock on the veld is good—perhaps at their best. It is well, however, to look ahead and make ready for the coming winter by the provision of winter feed in such forms as veld hay, silage, baled fodder from maize, manna, oats, teff, velvet beans, and the like, and by taking steps to ensure that water will be available for the stock in winter as near their grazing ground as may be.

POULTRY.

An iron tonic will be found beneficial to any birds that are not moulting satisfactorily. If the new feathers are forming, give a little increase in food containing some animal matter. Flowers of sulphur in the soft food will help to keep the birds in condition. Continue to give abundance of green food. Keep an eye on the birds which have made the best progress in the moult with a view to early mating.

STOCK.

Cattle.—The precautions recommended for February apply equally to March. Weather permitting, no opportunity should be lost of getting in good, sweet hay before grass is too old. Arrangements should be completed for storing as much silage as it is proposed to make, so that the crops reserved for this purpose may be harvested immediately they are ready.

Sheep.—The same precautions as for February should be taken, but as less rain may be expected, conditions will probably be more favourable. If late winter lambs are not desired, the rams should be removed from the flock.

TOBACCO.

The tobacco set out about Christmas time should be coming to maturity now, and the crop, if early and a good one, should be all reaped by the end of April.

VEGETABLE GARDEN.

Tomatoes, peas and beans should be in full bearing, and should be staked and tied. Weeding and cultivation should be extensively carried out. Seeds for late winter crops—beans, cabbage, cauliflower, peas, radish, turnips, spinach and beet—should be sown.

VETERINARY.

Horsesickness is now prevalent. Redwater and gallsickness occur in cattle all the year round, but the worst time is the summer, when ticks are numerous. Trypanosomiasis is a summer disease. Blue tongue may now be expected.

WEATHER.

Rains may be looked for in considerable quantity, though less than in previous months, 5 inches in Mashonaland and 3 inches in Matabeleland being normal, with as usual more on the eastern frontier. No useful rain need be reckoned upon after the end of this month, except on the eastern border, but the rainy season tapers off in an irregular and often erratic manner and without certainty.

PHASES OF THE MOON.

February :

3rd	New Moon
11th	First Quarter
19th	Full Moon
26th	Last Quarter

March :

4th	New Moon
11th	First Quarter
19th	Full Moon
26th	Last Quarter

April :

2nd	New Moon
10th	First Quarter
18th	Full Moon
24th	Last Quarter

Market Reports.

The market for produce has slightly hardened in some lines, *e.g.*, maize, kaffir corn and beans; potatoes are easier; and in other lines there has been little change.

Such movements as there have been in the live stock market do not shew an upward tendency of prices, except for horses and slaughter sheep.

On Wednesday, 8th December, Messrs. Boggie & Co. and H. K. Pinches & Co. held a combined sale in the latter's sale yards. Each auctioneer sold alternately for their respective clients. The combined sale was held more or less as an experiment with the object of collecting all buyers to one sale in place of putting them to the expense and trouble of probably attending three sales in one month in Gwelo. The sale was one of the largest ever held in Gwelo. Both Messrs. Boggie & Co.'s and Pinches & Co.'s sale yards were taxed to the utmost capacity to hold the large number of cattle, which amounted to about 2,000 head. There was quite an average attendance of buyers, hailing from Que Que, Gatooma, Salisbury, Selukwe and other places, but owing to the very large number of cattle, the bidding was rather slow, as dealers were inclined to hold back in the expectancy of bargains. Mr. Boggie started the sales shortly after 9 o'clock, disposing of fowls, turkeys, geese, ducks, farm implements, carts and wagons. There was quite a large number of turkeys, the average prices realised being 12s. 6d.; ducks 4s. 6d.; fowls 3s. to 4s. 6d. for special laying strain. Donkeys, mules and horses were not in demand. The sale of cattle started by Mr. Pinches disposing of a mob of trek and slaughter oxen, the property of Mr. Tom Meikle. The average price of trek oxen was £8; slaughter oxen about 37s. 6d. per 100 lbs. for prime beef. Mr. Boggie then entered the rostrum and started with breeding stock. There was a fair demand for heifers, which fetched from £4 10s. to £6 10s. A mixed lot of native cattle averaged about £5. Old cows with calves at foot averaged about £5, which was considered a fair

price. Africander and Friesland bulls, of which there were several in the yards, were not much in demand. There were enquiries for Devon and Hereford bulls, but there was none on the market.

The arrangements for handling the cattle were good. A large number of white men in addition to natives were in attendance in the sale yards. Notwithstanding this the number of cattle was rather in excess of the accommodation, and some confusion resulted; but it is satisfactory to note that no cattle were lost. About 1,200 head were sold the first day. The sale was renewed in the morning of the second day, when each of the auctioneers sold for about a couple of hours, when nearly another 100 head were disposed of. The sale indicated that the number of cattle were rather in excess of the demand, and it was questionable whether it was advantageous to hold a combined sale.

Mr. A. G. Hay held a successful sale on the Market Square, Bulawayo, on Saturday, 18th December. It was intended to be quite a small Christmas Stock Fair Sale, but there were about 250 head of cattle on the market, and practically the whole lot were sold. Besides the cattle there was a very fine display of turkeys, geese, fowls, ducks, sheep, lambs, etc. The prize for the best slaughter cattle went to two oxen belonging to Mr. H. S. Bawden; he brought six into town, which were animals about 8 or 9 years old, Africander type, averaging about eight hundreds. The second prize went to two very nice cross-bred Herefords bred by Mr. Moore, adjoining Mr. Jobling's farm; they had been sold to Mr. Colquhoun. Mr. Webb, Lonsdale Farm, Matopos, sold a very nice lot of 15 oxen, cross-bred Shorthorns, $2\frac{1}{2}$ to $3\frac{1}{2}$ years old, only veld fed, and they might have taken the prize if they had been in slightly better condition. Mr. Bradshaw, Trevelloe Estates, put four very nice oxen; they had been stable fed, but they wanted about another month's feeding to make them really prime quality. A fine lot of turkeys sent in by Mr. H. P. Fynn, Bembesi, realised 25s. each, the best ones. Mr. Bawden's six cattle realised £14 10s.; the cross-bred Herefords, of which there were six, among them being three native oxen, realised £10 17s. 6d. Four oxen, the property of Mr. Bradshaw, realised £12 each. Mr. Webb's cattle realised £8 7s. 6d.

Article.	Johannesburg.	Kimberley.	Bulawayo.	Salisbury.
Barley, 150 lbs.	13/0	—	—	25/0
Beans, 203 lbs.	27/6 41/0	29/0	—	25/0 30/0
Boer Meal, unsifted, 200 lbs.	—	—	48/0 52/6	48/0
Bran, wheaten, 100 lbs.	6/1 6/6	—	11/6 12/6	15/0
Flour, 100 lbs.	—	—	—	26/0 27/0
,, Colonial, 100 lbs.	—	—	26/6 27/0	27/6 30/0
Forage, 100 lbs.	4/0 5/6	—	—	7/6
,, Colonial Oat	—	4/0 4/6	—	—
	Bale.		Ton.	
Hay	6d. 8d.	—	40/0 45/0	35/0 40/0
Kaffir Corn, 200 lbs.	7/9 8/7	8/9 9/6	14/6 15/6	9/0 10/0
Manna, 100 lbs.	—	—	—	—
Mealies, S.A. White, 203 lbs.	10/9 11/3	9/0 9/6	12/0 12/6	8/6 9/6
Mealies, Yellow, 203 lbs.	11/6	10/6	—	—
Mealie Meal, White, 183 lbs.	—	—	—	9/0 9/6
Munga, 200 lbs.	—	—	—	11/0 12/0
Monkey Nuts, bag, 83 lbs.	12/9	11/6	8/0 8/6	7/0 8/0
Oats, 150 lbs.	10/0 12/0	—	18/6 20/0	25/0 27/6
Onions, 120 lbs.	8/9 11/9	5/0 8/6	—	12/6
Peas, 200 lbs.	—	—	—	—
Potatoes, new, 150 lbs.	10/0 12/0	3/6 12/0	14/6 16/6	7/6 10/0
,, old, 150 lbs.	3/3 9/6	—	—	—
Rapoko	—	—	—	13/0
Rye, 200 lbs.	16/6 18/3	—	—	—
Salt, 200 lbs.	4/6	—	—	11/6 12/0
Wheat, 203 lbs.	26/0 30/0	30/0 31/0	—	30/0
Butter, local, per lb.	10d. 1/3	1/1 1/3	—	2/0
Eggs, local, per dozen	1/5 2/0	10d. 1/6	—	2/0
Ducks, each	2/6 3/3	2/6 3/2	—	4/6 6/0
Fowls, each	2/0 3/0	1/5 2/6	—	3/0 4/6
Geese, each	3/5 4/0	—	—	9/0 11/0
Turkeys, cocks, each	10/6 18/3	6/3 10/6	—	—

LIVE STOCK.

Slaughter Cattle, 100 lbs.	36/0 40/0	—	27/6 35/0	37/6 40/0
Trek Oxen, trained	£6/10 £8/10	—	£6 £9	£8 £10
Local Cows, milk	£3/10 £12/0	—	£6 £15/0	—
Dairy Cows	—	—	£20 £30	—
Native Cows	—	—	—	£5/0 £6/0
Heifers, Colonial	£4 £6	—	£5 £17	£7/10 £8/10
,, Native	—	—	—	£4/10 £5
Pigs, live weight	4¾d. 6d.	—	3½d. 4½d.	4½d.
Horses, riding, salted	—	—	—	£35 £40
,, ,, unsalted	£4/10 £25	—	—	£25 £30
Mules, inoculated	£7 £23	—	£20 £30	£22 £25
Donkeys, geldings	£2/10 £5	—	£3/10 £6	£3/10 £5
,, mares	—	—	£5 £7/10	—
Goats	12/6 22/0	—	8/0 18/0	9/6 12/0
Persian Ewes	—	—	—	—
Cross-bred Ewes	—	—	—	—
Sheep, slaughter	12/0 22/0	—	15/0 28/0	27/6 30/0

Weather Bureau.

TEMPERATURES.

Station	November		December	
	Mean Max.	Mean Min.	Mean Max.	Mean Min.
MASHONALAND—				
Charter—				
Enkeldoorn	—	—	82·4	55·6
Hartley—				
Gatooma	89·7	64·4	88·4	64·6
Hallingbury Farm	86·2	61·2	83·4	60·0
Idaho	82·3	58·3	83·8	59·8
Lomagundi—				
Clydesdale	—	—	—	—
Eldorado Mine	86·85	63·2	—	—
Kanyemba	99·7	69·9	—	—
Sinoia	89·7	61·4	88·4	61·4
Sipolilo	87·8	63·8	83·7	62·2
Makoni—				
River Junction Farm ...	—	—	—	—
Rupurara	75·1	53·1	72·7	52·5
Mangwendi—				
Kwenda Hospital	77·5	63·9	—	—
Mazoe—				
Melfort Farm Estate ...	—	—	—	—
Shamva Mine	87·9	65·53	85·28	64·66
Melsetter—				
Melsetter	75·4	—	—	—
Mount Selinda	—	—	—	—
Vermont	75·5	60·01	79·4	59·1
Salisbury—				
Chishawasha	85·3	56·6	81·2	58·6
Salisbury (Agric. Dept. Offices)	—	—	—	—
,, (Gaol)	86·8	59·3	86·2	61·2
Umtali—				
Chiconga's Location ...	84·9	61·7	—	—
Summerfield	71·2	58·5	—	—
Umtali High School ...	—	—	—	—
Victoria—				
Eythorne	91·6	58·9	93·2	59·1
Morgenster	82·7	60·9	81·1	62·1
Victoria	82·5	61·0	82·8	60·38
MATABELELAND—				
Bulalima—				
Plumtree School	88·2	61·5	—	—
Tegwani	88·8	63·4	88·0	63·3
Bulawayo—				
Essexvale	86·7	60·8	85·61	63·03
Holly's Hope	—	—	90·4	63·9
Hope Fountain	86·4	—	85·5	—
Observatory	84·6	59·6	—	—
Rhodes Matopo Park ...	92·4	62·2	91·8	64·3
Gwanda—				
Antelope Mine	90·6	63·4	89·59	64·12

TEMPERATURES—*(Continued).*

Station	November		December	
	Mean Max.	Mean Min.	Mean Max.	Mean Min.
MATABELELAND—(Continued)				
Gwelo—				
Hagley (Iron Mine Hill) ...	79·1	57·6	80·6	57·6
Gwelo (Gaol)	82·5	55·4	84·7	55·7
Mangwe—				
Empandeni	90·6	60·2	90·3	61·0
Tuli—				
Mazunga	92·8	63·1	—	—
Tuli	94·0	64·4	—	—
Wankie—				
Guyo	—	—	—	—
Victoria Falls	—	—	—	—
Wankie (Hospital)	97·6	70·5	—	—

RAINFALL.

Station	November	December
MASHONALAND :		
Charter—		
Buhera	2·61	2·84
Bushy Park	1·57	2·64
Central Estates	—	—
Driefontein	3·66	4·31
Enkeldoorn	1·62	3·72
Grootfontein	4·34	—
Induna Farm	4·08	4·50
Marshbrook	3·45	2·78
Range	1·45	4·05
Riversdale	2·49	1·57
Spitzkop	5·61	4·20
Umniati	2·20	2·88
Umvuma (Railway)	3·68	—
Vrede	4·40	4·40
Wylde Grove	4·59	4·32
Hartley—		
Ardgowan	4·67	4·28
Auchter Leny	6·25	3·76
Battlefields (Railway)	3·05	—
Carnock Farm	4·45	2·79
Clifton Farm	3·98	3·14
Elephant Hill, Battlefields	5·40	5·02
Elvington	7·35	4·18
Gadzema (Railway)	6·30	—
Gatooma	3·38	4·85
Gatooma (Railway)	3·47	4·74
Gowerlands	2·09	4·30
Hallingbury	5·85	5·52
Hartley (Railway)	3·99	
Idaho	4·60	1·42

RAINFALL—*(Continued).*

Station	November	December
MASHONALAND—(Continued)		
Hartley—continued		
"Jenkinstown"	7·21	3·90
Makwiro	4·56	3·62
M'pofha Farm	7·13	4·60
Philiphaugh	2·90	3·59
Shagari	4·63	4·36
"Stoneygate"	5·21	2·79
Lomagundi—		
Argyle	2·36	4·82
Banket Junction (Railway)	3·82	—
Darwendale	2·58	3·81
Duxbury Farm	3·53	5·80
Eldorado (Railway)	3·59	—
Eldorado Mine	4·02	—
Golden Kopje Mine	2·40	6·68
Kanyemba	1·47	—
Lion's Den	2·66	5·78
Lone Cow Estate	1·24	—
Longmead	4·39	3·75
Nassau Estate, Urungwe	1·75	—
Palm Tree Farm	3·24	4·78
Sinoia	4·56	5·92
Sipolilo	2·24	3·46
Umvukwe Ranche	2·36	2·82
Makoni—		
Chimbi Source	5·13	1·58
Eagle's Nest	2·90	4·05
Ellavale	2·90	1·35
Gorubi Springs	1·85	3·51
Inyanga	1·81	—
Mona	6·21	2·80
Monte Cassino Mission	3·96	4·92
Odzi (Railway)	4·68	1·45
Rupurara	2·40	1·05
Rusape (Railway)	3·63	—
Rusape	—	—
Springs	3·91	3·00
St. Trias' Hill	5·38	4·46
Mangwendi—		
Bonongwe...	2·60	—
Glen Somerset	3·88	2·76
Good Hope	4·70	—
Huish Estate	3·78	—
Kwenda Hospital	2·69	—
Land Settlement Farm	3·40	1·63
Macheke (Railway)	3·34	7·16
Marandellas	—	—
Marandellas (Railway)	2·47	—
Mtoko	2·19	—
Mrewa	3·78	—
Nelson	2·90	3·99
Selous Nek	2·51	4·47
Theydon	2·12	
Tweedjan	0·88	2·67
Verdoy	4·73	2·56

RAINFALL—(*Continued*).

Station	November	December
MASHONALAND—(Continued)		
Mazoe—		
Avonduur	1·84	4·37
Bindura	1·88	3·04
Bindura (Railway)	2·19	—
Ceres	2·17	4·64
Chipoli	3·47	1·58
Claverhill	—	—
Dunmaglas	1·72	2·36
Fairview	—	—
Jumbo (Railway)	4·45	—
Kilmuir	1·97	4·44
Laguaha	1·88	3·40
Lowdale	2·39	—
Mazoe	2·02	4·56
Mazoe Citrus Syndicate	—	—
Melfort Estate	—	—
Mguta Valley	2·43	3·77
Mount Darwin	2·70	5·13
Omeath	1·26	4·02
Ruia	1·54	4·16
Ruoko Ranche	1·81	2·52
Shamva	2·91	—
,, Mine	3·32	1·79
Sleamish	—	—
Stanley Kop	3·17	4·56
Sunnyside	3·31	4·15
Teign	2·35	2·72
Umvukwe Flats	—	—
Volynia Ranche	2·47	3·91
Waterfall Farm	—	—
Melsetter—		
Brackenburg	2·22	1·35
Chikore	2·03	—
Chipinga	2·06	4·80
Helvetia	5·34	7·09
Melsetter	3·60	—
Mount Selinda	4·18	4·37
Mutambara Mission	2·50	2·73
Pasture	5·70	1·98
Tom's Hope	2·64	6·26
Vermont	5·52	9·68
Salisbury—		
Ardbennie	2·13	3·49
Avondale	1·52	5·60
Botanical Experiment Station	3·89	4·32
Bromley	3·05	6·17
Brookmead	2·90	2·04
Chishawasha	0·69	3·29
Cleveland Reservoir	1·02	3·22
Forest Nursery	4·15	—
Glenara	2·38	2·20
Goromonzi	1·28	2·83
Gwebi	1·62	2·26
Hillside	4·05	5·59

RAINFALL *(Continued)*.

Station	November	December
MASHONALAND—(Continued)		
Salisbury—continued		
Lilfordia	1·33	3·24
Salisbury (Agricultural Department) ...	—	—
,, (Club)	—	—
,, (Gaol)	2·72	—
,, (Railway)	2·91	—
Sebastopol	2·35	2·84
Selby	1·16	1·72
Stapleford	2·22	2·76
The Meadows	1·50	4·93
Vamona	4·43	4·16
Westridge	3·16	3·68
Umtali—		
Chiconga's Location	2·69	—
Odzani	3·21	3·30
Penhalonga	2·22	4·04
Premier Estate	2·01	2·24
Public School	—	—
Stralsrund...	3·00	3·37
Summerfield	4·03	—
Umtali (Railway)	1·92	—
Utopia	2·69	—
Victoria—		
Bikita	—	—
Chibi	0·77	3·51
Chilimanzi	4·13	—
Chingombe	2·70	2·33
Chiredzi Ranche, Ndanga	0·79	2·03
Clipsham	2·34	3·52
Eagle's Nest Ranche	2·36	—
Elephant Hill	—	—
Empress Mine	0·55	2·09
Eythorne	1·47	2·44
Fairburn	5·55	2·03
Fort Victoria	1·64	—
Gokomere	1·54	2·09
Gutu	4·15	1·02
Hunzanga	5·26	6·04
Makorsi River Ranche	0·81	2·17
Marah Ranche	—	—
Marthadale	5·45	4·04
Morgenster	1·08	4·49
Ndanga	3·66	2·73
Pamushana	2·87	3·75
Silver Oaks	1·46	1·36
Tokwe River Ranche...	2·20	0·75
Victoria	1·31	3·39
MATABELELAND :		
Belingwe—		
Albany	1·52	1·09
Anglo-French Block	0·67	—
Filabusi	1·05	0·68
Fort Rixon	2·03	2·83

RAINFALL *(Continued).*

Station	November	December
MATABELELAND—(Continued)		
Belingwe—continued		
Infiningwe	0·96	—
Insiza South	—	—
Insiza (Railway)	0·70	—
Mooifontein	—	—
Orangevale	1·24	2·04
Roodeheuvel	1·08	2·15
Scaleby	1·01	0·82
Shangani (Railway)	0·70	—
Tamba	0·90	—
Thornville	0·84	1·81
Wedza	0·93	5·58
Bubi—		
Inyati	3·08	—
Leighton Farm	—	—
Lochard Experiment Farm	2·39	—
Bulalima—		
Figtree	—	—
Mholi (late Magot)	1·74	0·95
Marula	—	—
Plumtree School	4·25	—
Riverbank Farm	1·90	2·08
Solusi Mission	0·49	4·49
Syringa	1·67	1·75
Tegwani	1·72	1·22
Tjompanie	1·96	1·46
Bulawayo—		
Balla Balla (Railway)	0·45	—
Bembesi (Railway)	2·02	—
Bulawayo (Railway)	—	—
Crombie's	1·77	2·36
Edwaleni	1·31	0·98
Essexvale	0·42	3·34
Government House	1·27	1·55
Gwaai (Railway)	0·93	—
Heany Junction (Railway)	1·16	—
Holly's Hope	0·61	2·05
Hope Fountain	0·69	1·85
Imbesu Kraal	1·22	1·86
Impondemi	1·80	1·29
Keendale	0·98	2·46
Khami	0·60	—
Lower Rangemore	1·74	1·60
Matopo Mission	0·91	2·16
Maxim Hill	0·43	1·10
Melinakanda Junction	1·28	2·62
Naseby	0·65	2·74
Nyamandhlovu (Railway)	1·93	—
Observatory	1·23	—
Raylton	1·05	—
Rhodes Matopo Park	0·95	2·83
Springs	—	1·77
Umgusa	1·15	1·74
Umkien	—	—

RAINFALL *(Continued)*

Station	November	December
MATABELELAND—(Continued)		
Gwanda—		
Antelope Mine	0·90	2·23
Gwanda (Railway)	0·56	2·13
,, (Gaol)	0·49	2·46
Malundi	—	—
Mtshabzi Mission	0·44	4·11
West Nicholson (Railway)	0·77	—
Gwelo—		
Coppy Nook	—	—
Dawn	—	2·98
Globe and Phœnix (Railway)	1·69	—
Globe and Phœnix Mine	1·84	4·10
Gwelo (Gaol)	3·92	1·62
Gwelo (Railway)	3·76	—
Hagley	5·41	4·92
Indiva Farm	—	—
Lalapanzi	—	—
Lalapanzi (Railway)	2·47	2·38
Lower Gwelo	2·34	1·22
Que Que	—	—
Rhodesdale Estate	4·91	2·48
Selukwe (Railway)	0·76	2·59
Sikombela Farm	2·80	3·09
Troy	2·31	4·93
Umhlali Farm	—	—
Woodendhose	0·91	3·51
Mafungabusi—		
Gokwe	4·77	1·69
Inyoka	2·89	2·09
Mangwe—		
Empandeni	1·82	0·41
Garth	2·39	0·95
Tuli—		
Lamulas	0·82	1·76
Langalanga	Nil	1·06
Makalali	1·83	1·65
Manantji	0·14	1·43
Mazunga	2·51	0·59
M'pande	0·60	0·19
Tuli	3·76	1·13
Wankie—		
Bombusi	1·68	1·39
Guyo	—	—
Malindi (Railway)	2·10	—
Victoria Falls	—	—
Victoria Falls (Railway)	1·68	—
Wankie Hospital	3·13	—
Wankie (Railway)	3·32	—

— No return.

Dates of Meetings of Farmers' Associations, Southern Rhodesia

(SUBJECT TO ALTERATION)

Name of Association	Place of Meeting	Secretary	1916		
			February	March	April
Bembesi	Queen's Mine Hotel	V. C. Andrews	4	3	7
Bindura	Bindura	A. C. Mills	12	..	8
Charter—Mgezi	Beatrice Mine	W. Krienke	23	29	26
Central	Umvuma	B. M. Yorke	..	..	..
Eastern Border (South Melsetter)	Various farmhouses	J. W. Scott	2	1	5
Enterprise	Arcturus Hotel	J. Watson	2	1	5
Felixburg	Felixburg	R. H. Brown	..	..	..
Figtree Branch, R.L. and F.A.	Figtree Hotel	W. H. Robertson	5	..	1
Gatooma	Gatooma	T. J. Golding	19	18	15
Gazaland	Chipinga	W. Wood	26	25	29
Greystone	Roodeheuvel Farm, Shangani	J. W. Spencer	12	11	8
Hartley	Hartley	J. de L. Nimmo	12	18	15
Headlands	Headlands	J. M. Harvard	26	25	29
Hunter's Road Farmers and Stockowners	Hunter's Road Siding	R. H. Twilley	12	11	8
Insiza—Shangani	Shangani	N. C. St. J. Brislin	..	1	..
Iron Mine Hill Proper	Iron Mine Hill	T. Irving	12	11	8
Lalapanzi and Iron Mine Hill	Lalapanzi and Iron Mine Hill	Cyril Allen	12	11	8
Lomagundi	Sinoia	W. Abbott	19	18	15
Macheke	Macheke	W. J. K. Webster	No dates fixed		
Makwiro	Makwiro	T. R. McLellan	18	17	21
Marandellas and Mangwendi	Marandellas Farmers' Hall	A. Nicholson	..	..	..
Makoni	Rusape	H. Barnes Pope	5	4	1
Marula	Marula Siding	Mac. W. Ingram	26	25	22
Mashonaland	Commercial Hotel, Salisbury	J. Reid Rowland	2	1	5
Matopo Branch, R.L. and F.A.	Sibali	W. Bathurst	..	8	..
Mazoe	Glendale Siding	R. S. Newett	..	15	..
Melsetter (North)	Various farms	Rev. R. Wodehouse	..	4	..
Midlands	Gwelo	P.O. Box 23, Gwelo	12	11	8
Northern Umtali	Farm "Summerfield"	R. O. H. Blurton	..	4	..
Norton and District	Norton Siding	T. A. Osler	5	4	1
Que Que	Que Que	E. J. Ross	19	18	15
Rhodesian Landowners and Farmers	Library Buildings, Bulawayo	H. S. Hopkins	25	31	28
Shamva	Shamva	J. M. Moubray	..	15	..
Selukwe	Selukwe	F. S. Clark	No dates fixed		
Somabula and Shangani Flats	Weltevrede School	G. B. Botha	..	11	
Umvukwe	Various ranches	H. K. Bracewell	12	11	8
Umtali	Christmas Pass Hotel	J. S. Holland	5	4	1
Victoria	Victoria	H. S. Hoatson	16	15	19
Vungu	Vungu	J. H. Erasmus	..	..	..
Western	Plumtree Hotel	A. Barclay	12	11	8

Departmental Notices.

Information for Farmers

The Department of Agriculture is prepared to furnish to farmers technical advice either by correspondence, or, where possible, by personal visits. All communications should be addressed in the first instance to the Director of Agriculture.

Crops

The Agricultural Branch deals with enquiries relating to agricultural practice, soils, crops, cultural operations, processes, seeds, trees, farm implements and machinery, etc.

Disposal of Pure Seed.

Farmers devoting special attention to the production of pure seed of any locally grown crops are invited to communicate with the Government Agriculturist, and at the same time to submit a ¼ lb. sample of any seed which they may have for disposal.

In addition to indicating the total amount of seed offered and the price f.o.r. the nearest railway station or siding, the correct name of the variety and the origin of the seed from which the crop was grown should be given. In the case of special attention having been devoted to seed selection, the methods employed should be described.

Where these stipulations are complied with, and the samples forwarded are deemed by the Agriculturist of sufficiently high quality for seed purposes, growers and intending purchasers will be put in touch with one another. It is hoped by this means to encourage the production of pure seed, and growers are urged whenever possible to sell their seed under guarantee of trueness to name, type and sample deposited with the Department.

After placing growers and would-be purchasers in touch with one another, the Department can accept no further responsibility except in the position of adjudicator when bulk supplies are thought inferior to sample and description, in

which case both parties will be required to abide by the decision of the Department.

For further particulars see article on Pure Seed Supply, *Rhodesia Agricultural Journal,* February, 1914.

Farm Seeds

Napier's Fodder roots are still available for sale and distribution at 5s. per 100, £2 per 1,000.

All orders must be accompanied by remittances for the full amount of seed ordered, and in cases where delivery is to a siding, the amount of railage must be added. Should it be found impossible to complete any order, the balance of cash will be refunded to the purchaser.

Forestry—Sale of Trees

The undermentioned varieties of trees will be available for sale from December onwards.

Price, f.o.r., Salisbury, 1d. each, 8s. 4d. per 100.

The following reductions are made on large orders on condition that the tins are returned. Otherwise they will be charged up at 3d. per tin :—

£3 per 1,000. £2 10s. per 1,000 for orders of over 5,000.

Average height of trees—3 to 9 inches.

Average number in tin—25.

Average weight of tin—25 lbs.

Belhambra.
Callitris calcarata—Cypress pine.
do. robusta—Murray pine.
Casuarina leptoclada—Beefwood.
Cedrela toona—Toona.
Cupressus sempervirens, var. horizontalis — Common cypress.
do. torulosa—Himalayan cypress.
Dalbergia sissoo—Sissoo.

Eucalyptus amygdalina—Peppermint gum.
do. botryoides.
do. citriodora—Lemon-scented gum.
do. corynocalyx—Sugar gum.
do. crebra—Ironbark.
do. leucoxylon.
do. melliodora—Grey box gum.
do. microtheca—Coolibah gum.
do. paniculata—Ironbark.
do. robusta.
do. rostrata—Red gum.
do. saligna.
do. siderophloia.
Jacaranda.
Pinus longifolia—Chir pine.
Thuya orientalis—Arbor vitæ.

Also in stock larger trees at 3d. each; average height of tree, 9 inches to 2 feet 6 inches; average weight of tins, 25 lbs.; number in tin, 4.

Fourcroya gigantea (Mauritius hemp), 1s. per 100.
Agave sisilana (Sisal hemp), 3s. per 100.
Paspalum, 5s. per 1,000 rooted slips.

Shrubs for Sale

Price, f.o.r., Salisbury, 6d. each. There is no guarantee to have any particular variety of shrub in stock, but everything possible will be done to supply the demand. Most of them are planted four in a tin, but there is usually a fair stock of single tins.

Red.

	Approx. height of growth.
Bougainvillæa	10 ft.
Holmskioldia	8 ft.
Habrothamnos	5 ft.
Bottle brush	10 ft.
Russellia	3 ft.
Bauhinia	8 ft.
Euphorbia jacquiniflora	4 ft.
Salvia	3 ft.

Homelia patens	3 ft.
Poinsettia	7 ft.
do. double red	7 ft.

Pink.

Lagerstrœmia flosregina	10 ft.
Alamanda	6 ft.
Sensitive plant	1 ft.
Salvia	3 ft.

Blue.

Iochroma lanceolatum	10 ft.
Heliotrope	3 ft.
Buddleia	6 ft.
Rhodesian tree lobelia	3 ft.
do. lupin	6 ft.

White.

Spirea (Cape May)	4 ft.
Lantana bush	8 ft.
Gardenia	4 ft.
Plumbago	3 ft.
Bauhinia	8 ft.
Moon flower	6 ft.
Magnolia	14 ft.
Tree lupin	6 ft.
Pittosporum undulatum	7 ft.

Yellow.

Tecoma Smithii	10 ft.
Thevetia nerifolia	6 ft.
Cape jasmine	10 ft.
do. laburnum	10 ft.
Holmskioldia	10 ft.
Buddleia	10 ft.
Alamanda nerifolia	4 ft.
Streptosolon Jamesonii	3 ft.
Hypericum—St. John's Wort	4 ft.
Asclepias	3 ft.
Ribes	3 ft.

Mauve.

Iochroma	10 ft.
Salvia	2 ft.

Climbers.

Golden shower—Yellow.
Clitoria ternata—mussel shell creeper—Blue.
Potato creeper (Solanum Wenlandii)—Blue.
Phaseolus caracalla—White.
Beaumontia—White.
Jasmine—White.
Podranea—Zimbabwe creeper—Pink.
Dutchman's pipe (Aristolochia sypho).

Applications together with remittances and full particulars regarding forwarding should be addressed to the Government Agriculturist and Botanist, Department of Agriculture, Salisbury.

Poisonous Plants

It is of great importance that as soon as possible a study should be made of those plants found in Southern Rhodesia which are poisonous or deleterious to small or large stock. Farmers and others who have known, or suspected poisonous plants on their property, are requested to communicate with the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, at the same time forwarding specimens of the plant, including stem, leaves, flowers, and, where possible, fruit. Any particular regarding the habits of the plant will be welcomed, and in return the Department will supply all available information regarding the plants.

Live Stock

The Animal Industry Branch is prepared to advise with regard to all matters connected with stock breeding, selection, feeding and registration of stud animals, the dairy industry, poultry management, farm buildings for stock, and kindred subjects. Buyers and sellers of stud stock in Rhodesia are also put in touch with one another.

Entomology

The Government Entomologist advises on matters connected with insect pests of live stock, crops, and fruit trees, and also undertakes the inspection of nurseries and of the importation of plants from abroad.

Chemical Analyses

The Government Agricultural Chemist deals with matters relating to the composition of soils, fertilisers, farm produce of vegetable or animal origin; also the investigation of poisons and of articles of potential economic value.

Nominal charges are made, which, while not covering the cost, will help to defray the expense and serve as a proof of good faith. Samples, carriage prepaid, together with full particulars regarding the subject should be addressed to the Agricultural Chemist, Department of Agriculture, Salisbury.

A schedule of charges and directions for taking samples will be furnished on application.

With all analyses, reports will be furnished explanatory of the results and, when possible, advice given as to the nature, properties and value of the material.

No charge will be made for analysis where the material forwarded is considered by the Director of Agriculture and Chemist to be of sufficient general interest.

Citrus Culture

The Government Citrus Adviser advises on all matters connected with the citrus and deciduous fruit industry.

Services of Government Veterinary Surgeons

1. The services of Government Veterinary Surgeons are available to the public, free of charge, for the following purposes only :—

(1) Attending and giving professional advice in connection with the following diseases, viz. :—Anthrax, Contagious abortion, East Coast Fever, Epizootic Lymphangitis, Foot and Mouth Disease, Farcy, Foot-rot, Heartwater, Glanders, Intestinal parasites amongst sheep and goats, Liver Disease, Lungsickness, Osteo Porosis, Malarial Catarrhal Fever (blue tongue), Rabies, Redwater, Rinderpest, Scabies, Sponziekte (quarter evil), Swine Fever, and any other diseases which may in future be scheduled in terms of section 3, sub-section 18 of the "Animals Diseases Consolidation Ordinance, 1906." Attending to cases of disease amongst live stock which, though not of a contagious or infectious character, may be of general public importance.

(2) Applying tests in regard to Glanders, Tuberculosis, or any other disease against the introduction or spread of which tests are applied under regulations.

(3) Inoculations against the following diseases :—

Horsesickness, Lungsickness, Anthrax, Quarter Evil, Redwater, Malarial Catarrhal Fever (blue tongue). A fee to cover the cost of serum and virus will be charged.

2. The following charges shall be made and payable for services rendered by the Government Veterinary Surgeons in other cases, viz. :—

	£	s.	d.
(1) For every professional visit within three miles of his office or residence	0	5	0
(2) For every professional visit beyond such distance	0	10	6
plus an additional charge of 2/6 per hour whilst engaged in such visits or £2/2/0 a day of 24 hours;			
(3) For advice given at the Veterinary Surgeon's office, for each animal, per visit	0	2	6

(4) The following to be charged in addition to visiting fees :—

a. For every examination as to soundness, each	£1	1	0
b. For castration, horses, each	1	1	0
c. For castration, bulls, each	0	5	0
d. For castration, donkeys, each.. ...	0	10	6
e. For parturition cases, mares, each	2	2	0
f. For parturition cases, cows, each..	1	1	0
g. For other operations, according to nature, from 5/- to £2/2/0.			

3. Double the above fees will be payable for services rendered on Sundays, public holidays, and between the hours of 7 p.m. and 7 a.m.

4. Applicants for the services of Government Veterinary Surgeons must at their own cost provide the necessary transport for the conveyance of these officers from, and back to, their residence or nearest railway station.

5. Farmers and owners of stock throughout the country frequently telegraph for a Government Veterinary Surgeon to be sent to attend an animal which has been taken seriously ill. It is rarely possible to comply with these requests at once, as the Veterinary Surgeon may be engaged on duty which he cannot leave, or is at such a distance from where his services are required that he can hardly be expected to arrive in time to be of any service in an urgent case. Hence much valuable time is wasted, the owner of the animal is dissatisfied, and the veterinary staff discredited. To obviate this, in all cases where veterinary advice and assistance are required, the owner should telegraph to "Veteran," Salisbury, with prepaid reply, the nature of the complaint that the animal is suffering from, giving as full and accurate a description of the symptoms as possible. This will enable the Chief Veterinary Surgeon to telegraph advice at once and state whether he is able to arrange for veterinary attendance on the case or not, and save valuable time, which is always of importance in acute cases.

6. The services of Government Veterinary Surgeons will only be available for private work with the consent of such officers, and when such work does not interfere with their official duties, or when the services of a private practitioner are not available.

7. As the arrangement of allowing Government Veterinary Surgeons to attend to private cases is intended purely for the benefit of farmers and stock-owners who may wish to obtain professional advice, no responsibility whatever will be accepted for any loss of stock, etc., which may result from the negligent treatment or advice, or wilful default, of any Government Veterinary Surgeon.

8. All fees collected in terms of these Regulations are payable to the Treasury through the local Receiver of Revenue.

Irrigation

From the Agricultural Engineer assistance may be obtained by farmers for the following :—

1. In the locating of possible irrigation projects.
2. In the preparation of surveys or plans and for irrigation works, including weirs, dams, furrows, pumping plants, and determining the extent of land which may be brought under irrigation schemes, together with rough estimates of costs.
3. In the supervision of construction and carrying out of projects.
4. In the selection of suitable sites for boring operations.
5. Preparing specifications, etc., regarding pumping plants, windmills, and agricultural machinery.
6. Giving general advice on cognate subjects.

Informal advice of a general character will be given to applicants making enquiry by letter or in person. Any applicant desiring professional assistance likely to occupy more than one day should apply for advice in writing. All applicants should specify clearly the nature of the project on which they seek advice, and should give full particulars as to the distance and direction of their farms from some well-known centre. Applicants will be required to provide suitable means of transport for the officer concerned during the period devoted to work on the spot; to provide any unskilled labour that may be required; and to provide for any other contingent services. Applications should be addressed to the Director of Agriculture, who will endeavour to arrange visits as far as possible in order of application, but with due regard to situation, in order to obviate unnecessary travelling and delay. The services of

the Agricultural Engineer are given free, but in cases demanding prolonged individual attention, or repeated supervision, a charge may be made according to circumstances.

Samples

In connection with enquiries, especially with regard to diseases amongst crops, insect pests, soils, grain and the identification of plants, specimens should, wherever possible, be sent, together with full details. It is found that such parcels are often forwarded without any indication of where they are from or why they were sent and it is difficult in such cases to trace the sender. It is, therefore, requested that persons when forwarding samples for examination, indicate clearly their names and address on the package, so as to enable their requirements to be attended to without delay.

Charges for Dipping Cattle at Government Dipping Tanks.

A charge of 1d. per head is made in respect of all cattle dipped at Government dipping tanks.

Unweaned calves will be dipped free of charge.

Payment may be made in cash or by means of books of coupons at £1, 10/- and 2/6, which can be obtained from Civil Commissioners, Native Commissioners, or through all Veterinary Surgeons and Cattle Inspectors.

The tanks to which these provisions at present apply are the following :—

Salisbury (3), Bulawayo (3), Inyati, Umtali, Penhalonga, Melsetter, Marandellas, Macheke, Mazoe, Lomagundi, Hartley, Gwelo, Selukwe, Enkeldoorn, Victoria, Gwanda, Gatooma, Que Que, Umvuma, Kimberley Reefs.

Lectures for Farmers

The services of certain of the officers of the Department of Agriculture and the Veterinary Department are available for purposes of delivering lectures on subjects upon which they have special knowledge. As far as practicable, lectures will be accompanied by demonstrations at the time or subsequently in

the field. Owing to the many calls on the time of the staff and the exigencies of their duties, alternative dates are desirable in order to avoid disappointment. The following topics are offered as examples of subjects that may be dealt with in this manner, but the suggestion of other themes is invited.

Agriculture.—Maize growing; Maize selection and maintenance of the breeding plot; Points of maize and maize judging, with demonstrations; Utilisation of granite vlei soils; Ground nut culture; Rotation crops for home use and for sale; Veld improvement by winter grasses; Production of foodstuffs for the mines; Ensilage; Fungoid diseases of maize and wheat; Wheat, oats and lucerne under irrigation; The prospects of cotton culture in Southern Rhodesia.

Veterinary Hygiene.—Detection and prevention of disease; The care of live stock.

Live Stock.—Judging of cattle according to breeds, and for beef, milk and draught; feeding and kraaling of live stock; general principles of cattle breeding; management of imported stock; grading up of native or local stock with pure bred bulls.

Dairying.—Home butter-making; building and equipment of a farm dairy; handling and marketing of milk; packing and marketing of butter; construction of cow houses.

Swine Husbandry.—Breeding and feeding of swine; some suggestions for the production of first-class bacon pigs; construction of piggeries at moderate cost.

Chemistry.—The principles of soil fertility; the principles of manuring; the value of lime in agriculture; chemistry of milk and its products (accompanied by demonstrations in milk-testing).

Entomology.—Economic entomology on the farm; the role of insects and their allies in the transmission of disease; scale insects and fruit trees and methods for their control; insect pests and maize; enemies of the potato, insect and fungus; the value and objects of plant import and nursery regulations.

Irrigation.—Methods of applying water to land for irrigation; the measurement of water in connection with irrigation; canal irrigation; storage reservoirs; hints on the selection of sites and on the design of earthen and other dams; irrigation by pumping, with notes on the selection of plants.

Enquiries and invitations should in the first instance be addressed to the Director of Agriculture, Salisbury.

Departmental Bulletins.

The following Bulletins, consisting of reprints of articles which have appeared in this Journal, are available for distribution free of charge to applicants in Rhodesia :—

AGRICULTURE.

No. 61. Requirements in sending Botanical Specimens to the Department for Identification.

No. 62. Services of Agricultural Engineer.

No. 64. Hints on Irrigation—Small Gravitation Schemes, by W. M. Watt.

No. 81. Possibilities of Export Trade in Oil Seeds, by H. Godfrey Mundy, F.L.S.

No. 90. Reports on Experiments—Experimental Station, Salisbury, 1910-1911, by J. H. Hampton.

No. 94. Second Report on Experiments, by J. H. Hampton.

No. 125. Subterranean Water, by W. M. Watt.

No. 155. The Manuring of Maize on the Government Experimental Farm, Gwebi, 1912-13.

No. 160. Hints on Irrigation—Pumping Plants, by W. M. Watt, Agricultural Engineer.

No. 177. Notes on the Raising of Seedling Trees, by F. B. Willoughby.

No. 189. The Manuring of Maize on the Government Experiment Farm, Gwebi, by G. N. Blackshaw, B.Sc., F.C.S.

No. 192. A Calendar of Crop Sowings, by H. Godfrey Mundy, F.L.S.

No. 203. Ensilage, by J. A. T. Walters, B.A., and The Feeding of Ensilage to Dairy Cattle in Winter, by R. C. Simmons.

No. 206. Hints on Irrigation : Small Earthen Storage Reservoirs, by W. M. Watt.

No. 209. The Agricultural Returns for 1914, by B. Haslewood, F.S.S.

No. 212. Citrus Fruits in Rhodesia, by A. G. Turner.

No. 216. Manuring of Maize on Government Experiment Farm, Gwebi, by A. G. Holborow, F.I.C.

No. 218. Useful Measurements of Maize, by J. A. T. Walters, B.A.

No. 220. Reports on Crop Experiments, Gwebi, 1914-15, by E. A. Nobbs, Ph.D., B.Sc.

No. 221. Results of Experiments, Longila, 1914-15, by J. Muirhead.

No. 222. Costs of Farm Operations, Gwebi.

No. 300. The Dangers and Prevention of Soil Erosion, by W. M. Watt.

Tree Culture in Southern Rhodesia, by P. B. S. Wrey, A.M.I.C.E.

CROPS.

No. 88. Chicory Growing, by H. Godfrey Mundy, F.L.S.

No. 106. Cultivation and Preparation of Ginger.

No. 126. Turkish Tobacco.

No. 132. Sumatra Tobacco, Hints to Rhodesian Growers, by C. J. Sketchley.

No. 138. **Tobacco Culture (Virginia)—Harvesting and Curing.**

No. 162. Rhodesian Maize: The Principal Types and their Points, by J. A. T. Walters, B.A., Assistant Agriculturist.

No. 170. Production of Pedigree Seed—Maize, by H. Godfrey Mundy, F.L.S.

No. 174. Notes on Hop Growing, by H. Godfrey Mundy, F.L.S.

No. 175. Notes on Lucerne, by H. Godfrey Mundy, F.L.S.

No. 176. The Cultivation of Castor Oil Beans, by H. Godfrey Mundy, F.L.S.

No. 179. Buckwheat, by H. G. Mundy, F.L.S.

No. 181. Sunflower Cultivation, by H. G. Mundy, F.L.S.

No. 188. The Ground-Nut or Monkey Nut, by H. Godfrey Mundy, F.L.S.

No. 193. Oats in Southern Rhodesia, by H. Godfrey Mundy, F.L.S.

No. 194. Rye, by J. A. T. Walters, B.A.

No. 201. Dhal or Pigeon-Pea, by J. A. T. Walters, B.A.

No. 207. Crop Rotation in Southern Rhodesia, by J. A. T. Walters, B.A.

ENTOMOLOGY AND VEGETABLE PATHOLOGY.

No. 43. Citrus Psylla.

No. 75. Fumigation of Fruit Trees with Hydrocyanic Acid Gas, by R. W. Jack, F.E.S.

No. 120. Some Insect Pests of Maize, by R. W. Jack, F.E.S.

No. 139. Termites, or "White Ants," by Rupert W. Jack, F.E.S.

No. 140. Insect Pests of Tobacco in Southern Rhodesia, by R. W. Jack, F.E.S.

No. 142. The Bean Stem Maggot, by R. W. Jack, F.E.S.

No. 147. Root Gallworn, by R. W. Jack, F.E.S.

No. 148. Darkling Beetle Grubs Injurious to Tobacco, by R. W. Jack, F.E.S.

No. 151. Potato Spraying Experiments for the Control of Early Blight, by Rupert W. Jack, F.E.S.

No. 154. Borers in Native Timber: Results of Experiments with Preservatives, by Rupert W. Jack, F.E.S.

No. 158. Two Ladybirds Injurious to Potato Plants, by R. W. Jack, F.E.S.

No. 171. The Cabbage Web-Worm—A Pest of Cabbage and Allied Plants, by R. W. Jack, F.E.S.

No. 172. Diseases of the Potato Tuber and the Selection of Sound Seed, by R. W. Jack, F.E.S.

No. 176. Illustrations of Natural Forest in relation to Tsetse Fly, by R. W. Jack, F.E.S.

No. 187. The Dusty Surface Beetle, by Rupert W. Jack, F.E.S.

No. 197. Chafer Beetles, by R. W. Jack, F.E.S.

No. 204. Some Injurious Caterpillars, by R. W. Jack, F.E.S.

No. 214. Some Household Insects, by R. Lowe Thompson, B.A.

No. 219. More Household Insects, by R. Lowe Thompson, B.A.

VETERINARY.

No. 50. Epizootic Abortion in Cattle, by Ll. E. W. Bevan, M.R.C.V.S.

No. 51. Strangles, by F. D. Ferguson, M.R.C.V.S.

No. 53. Animals Diseases Consolidation Ordinance, 1904.

No. 65. Common Ailments of the Horse, by D. R. Chatterley, M.R.C.V.S.

No. 84. African Coast Fever—Diagnosis of Gland Puncture, by Ll. E. W. Bevan, M.R.C.V.S.

No. 95. Oestrus-ovis in Sheep, by Alec King.

No. 103. Dipping and Tick-Destroying Agents, by Lt.-Col. H. Watkins-Pitchford.

No. 121. Rabies, by Ll. E. W. Bevan, M.R.C.V.S., and T. G. Millington, M.R.C.V.S., D.V.H.

No. 165. Report of Veterinary Conference, Bulawayo, April, 1913.

No. 180. Note on the Treatment of Biliary Fever of the Horse with Trypan Blue, by Ll. E. W. Bevan, M.R.C.V.S.

No. 191. Scab or Scabies in Sheep and Goats, by Rowland Williams, M.R.C.V.S.

No. 195. Some Notes on the Systematic Dipping of Stock, by C. R. Edmonds, Assistant Chief Veterinary Surgeon, and Ll. E. W. Bevan, Government Veterinary Bacteriologist, Southern Rhodesia.

No. 202. Distomatosis or Liver Fluke in Cattle and Sheep, by Rowland Williams, M.R.C.V.S.

No. 215. African Coast Fever, by Ll. E. W. Bevan, M.R.C.V.S.

No. 223. A Note on Contagious Abortion, by Ll. E. W. Bevan, Government Veterinary Bacteriologist.

LIVE STOCK.

No. 96. Swine Breeds and Breeding of, by Loudon M. Douglas, F.R.S.E.

No. 101. Hints to Dairy Farmers, by J. C. Jesser Coope, F.C.S., N.D.D.

No. 145. Prospects for Importation of Cattle from Australia, by Eric A Nobbs, Ph.D., B.Sc.

No. 161. Notes on Cattle Breeding, Part III., by R. C. Simmons.

No. 163. Feeding and Care of Imported Cattle, by R. C. Simmons.

No. 167. The Construction of Dipping Tanks for Cattle.

No. 190. The Principle of the Winter Feeding of Dairy Cattle, by R. C. Simmons.

No. 208. Water in the Diet of Live Stock, by Ll. E. W. Bevan, M.R.C.V.S.

No. 210. The Care and Feeding of Calves in Dairy and Stud Herds, by R. C. Simmons.

No. 211. The Fattening of Pigs on Granite Farms in Mashonaland, by R. C. Simmons.

MISCELLANEOUS.

No. 93. Formation of Agricultural Credit Associations in Rhodesia, by Loudon M. Douglas, F.R.S.E.

No. 119. Some Notes on Charcoal Burning, by Eric A. Nobbs, Ph.D., B.Sc

No. 129. How to Make Use of the "Fencing Ordinance, 1904." by N. H Chataway.

No. 134. Plans and Specifications for Flue Curing Tobacco Barns.

No. 144. Rhodesian Tobacco—Prospects of an Australian Market, by Eric A. Nobbs, Ph.D., B.Sc.

No. 152. A School of Agriculture for Southern Rhodesia, by Eric A. Nobbs, Ph.D., B.Sc., Director of Agriculture.

No. 157. Hints on Brickmaking, by G. T. Dyke.

No. 168. Report on the Methods of Growing, Curing and Selling Bright Tobacco in Virginia, U.S.A., by H. Kay Scorror.

No. 183. The Rainy Season in Southern Rhodesia, by the Rev. E. Goetz, S.J.

No. 184 Cream—Its Separation, Handling and Sale to Butter Factories, by R. C. Simmons.

No. 186. Concrete and Reinforced Concrete, by E. Hardcastle, M.I.E.E.

No. 196. Collection of Agricultural Statistics in Southern Rhodesia, by Eric A. Nobbs, Ph.D., B.Sc.

No. 198. Poultry Keeping for the Rhodesian Farmer, by Frank Sheppard.

No. 199. Eucalypts for the Farm, by J. J. Boocock.

No. 205. Home Butter Making, by R. C. Simmons.

No. 213. Hydraulic Rams, by W. Martin Watt.

No. 217. Windbreaks and Hedges, by F. B. Willoughby.

Malarial Fever : How it is caused and how it may be prevented, by Sir Ronald Ross, F.R.C.S., D.Sc., LL.D., F.R.S., K.C.B., etc.

The Prevention and Treatment of Blackwater Fever, by Dr. A. M. Fleming.

Malaria : its History, Prevention and Cure, by A. M. Fleming, C.M.G., M.B., F.R.C.S. (Ed.), D.P.H. (Camb.), Medical Director.

Game Law : Summary of.

Terms for Analysis by the Department of Agriculture, of Produce, Soils, Water, etc

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HANDBOOK OF TOBACCO CULTURE for Planters in Southern Rhodesia. Sold by the Department of Agriculture. 2/6.

Employment on Farms.

The Department of Agriculture receives numerous enquiries from persons of varied attainments, age and financial position for openings on farms, as managers, assistants and learners, requiring remuneration on corresponding scales, or willing to give services in return for keep.

In order that work may be found for the above and needs of farmers met, applications are invited from both employers and persons seeking employment. Applications are also invited from artisans, such as masons, bricklayers, carpenters, fencers, well sinkers, concrete workers, and the like who may desire work on farms. In cases where employers have obtained the labour they require, or applicants for employment have found work, it is requested that notification be at once sent to the Department of Agriculture, in order that unnecessary correspondence be avoided.

Replies to the following applications should be addressed to the initials of the advertisers, c/o Director of Agriculture, who will forward the letter to the party referred to.

SITUATIONS VACANT.

J. C. J.—For learner; must be strong and willing to give services in return for keep. Rusape.

P. & C.—Man to take charge of agricultural work. No salary, but shares.

W. M.—Young man as overseer of labour. Native language necessary. Small salary if satisfactory.

D. A. B.—Capable man for mixed farm work and cattle. Married preferred; wife to take charge of dairy and poultry.

J. S.—Experienced man having team of oxen to work farm on terms. Married man preferred.

SITUATIONS WANTED.

H. H.—As manager, married man, many years' South African experience on very large farm; stock, dairy and general agriculture.

C. Sp.—As assistant. Experience with irrigation work.

F. L. H.—Englishman (unfit for military service) as farm assistant; cattle and agriculture. Remuneration and board.

N. E. G.—As assistant. Natal experience.

C. G. T.—As assistant. Experience of farming. Speaks Dutch and native languages.

S. M. W.—Would help on farm; experienced fitter-mechanic. Wounded in war and discharged.

F. C. W. R.—Assistant; four years' farm experience.

R. T. T.—As assistant. Rhodesian experience.

J. B. H.—To manage farm or on shares. Best Rhodesian references.

A. T. G.—As assistant. Experienced with cattle, pigs and general farming.

A. P.—As manager or assistant. Rhodesian experience.

J. R.—As working manager, farm or ranch. Cape and Rhodesian experience. Good references. No encumbrances. Would open up new farm. Salary or shares.

M. & S.—Two young Belgians, discharged from army medically unfit, wishing to settle in Rhodesia, desire to work on farms as learners in return for board and lodging.

G. A. H.—Work on farm wanted. Six years' Rhodesian experience mixed farming, dairy stock and building.

J. C. C.—Married man, 45, with 21 years' experience, partly in Rhodesia, desires employment as manager of farm or ranch.

D. J.—As manager. Fifteen years' experience. Temperate, industrious. Good testimonials.

C. J. P. W.—Employment on farm wanted by a Rhodesian.

A. F. O.—Employment as assistant. Rhodesian experience.

P. W. W.—As manager of mixed farm, dairy, etc., with small salary and interest in stock. Married. Rhodesian and Colonial experience. Reference Mr. R. C. Simmons, Agricultural Department.

G. R. P.—Intending settler wishes to take charge of mixed farm to learn local conditions. Married; wife would look after dairy. Age 25; bilingual.

L. P.—Young man prepared to assist on or take charge of ranch. Rhodesian experience of general ranch work.

Government Notices.

No. 50 of 1912.] [8th February, 1912.

(As amended by Nos. 329 and 383 of 1914.)

AFRICAN COAST FEVER.

Regulations regarding the movement of cattle and the prevention and suppression of disease.

1. UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw Government Notices Nos. 329 of 1910 and 308 of 1911 and make the following provisions in lieu thereof :—

2. The various districts of Southern Rhodesia are hereby declared an area infected with African Coast Fever for the purposes of section 5 (2) of the aforesaid Ordinance, and, save as hereinafter set out, all movement of cattle within the said districts is prohibited until further notice.

General Movement.

3. For the purpose of section 22 (1) of the said Ordinance, the following shall be regarded as places within the boundaries of which the movement of cattle may be allowed without special permission :—

(a) Single farm.

(b) An area occupied by an owner or lessee, under one management, comprising contiguous farms and situated within one cattle transport area. The mere possession by an owner or lessee of grazing rights over a contiguous farm or farms shall not constitute occupation of such farm or farms.

(c) An area the property of one owner.

(d) For grazing purposes, an area within a radius of four miles of native kraals situated on unalienated land or in reserves, save and in so far as such area includes any private land.

The sites of such kraals shall be deemed to be the places where they are situated at the date of promulgation of these regulations.

(e) An area under the management or control of any Municipality, Sanitary Board or Village Management Board.

4. Notwithstanding the provisions of the last preceding section, or of section 9 hereof, the Chief Inspector may, on the outbreak of disease, or for such other cause as may be deemed expedient, direct the isolation or quarantine of cattle on a limited area of the aforesaid places.

5. The movement of cattle from place to place may be permitted under the special permission, in writing, of an Inspector, Sub-Inspector, or other officer or person duly authorised by the Administrator to grant such permission.

6. No permission as aforesaid shall permit the movement of cattle—

(a) Without the written consent of the owners, occupiers or managers of occupied land, and in the case of native reserves, of the Native Commissioner of the district over which land or reserve such

cattle will pass, whether along roads or otherwise; provided, however, that refusal to grant such consent shall be in writing, and provided further that if the Controller of Stock or the Chief Inspector shall consider that such consent is withheld without good and sufficient cause he may permit of movement without such consent.

If any such person mentioned above refuse to give consent or to state a reason for refusing to do so in writing, no valid objection shall be deemed to exist and movement may be permitted without such written consent.

(b) Within a veterinary district as defined in the Schedule annexed hereto from one transport area to or through another without the consent of the Cattle Inspector in charge of such area.

(c) From any veterinary district to or through another without the consent of the District Veterinary Surgeon of such district.

Slaughter Cattle.

7. Cattle moved to any centre for slaughter under the provisions of these or any other regulations shall, on arrival, be immediately taken to such quarantine area (if any) as is provided for the purpose and immediately branded with the letters "V.D." on the near hip.

8. Cattle admitted to a quarantine area in terms of the last preceding section shall be slaughtered within twenty-one days of the date of admission, and shall not be permitted to leave the same except for the purpose of being slaughtered at the appointed abattoir, and if found outside such area, except for the said purpose, may be destroyed on the order of the Chief Inspector or Controller of Stock; provided, however, that the Chief Inspector may allow the removal of cattle from such an area under such conditions as he may prescribe.

Transport Cattle.

9. The use of cattle for draught purposes is prohibited except :—

(1) Within the boundaries of the places defined in section 3 (a), (b) and (c) hereof.

(2) Within the boundaries of areas already fixed for the use of cattle for draught purposes in terms of regulations published under Government Notice No. 329 of 1910, or such other areas as may be fixed by the Administrator.

10. Notwithstanding the provisions of section 9, no permit shall authorise the working of cattle

(a) which are not clearly and distinctly branded with the registered brand of the owner;

(b) in any wagon or vehicle which shall not have the owner's name and address legibly and permanently inscribed on the right side thereof.

11. No wagon or other vehicle drawn by oxen shall be moved from one cattle transport area into another without the permission of the Cattle Inspectors concerned, and under such conditions as they may impose.

General Provisions.

12. On the outbreak or suspected outbreak of disease, the Administrator may declare an area of infection around and embracing the place of outbreak or suspected outbreak, and a further area or areas around such area of infection as a guard area, whereupon all movement of cattle into and from place to place within such area or areas shall be immediately suspended, except as hereinafter provided.

A.—*In areas of infection and guard areas:—*

(1) Cattle in transit by rail may be moved through such area.

(2) Cattle from beyond the borders of Southern Rhodesia may be detrained within such area or areas *en route* to destination.

(3) Cattle for *bona fide* farming, dairy and slaughter purposes may be moved into such area or areas by permission of the Chief Inspector and under such conditions as he may impose.

B.—*In guard areas only:—*

Cattle may be moved into and from place to place within such area under the conditions of section 6 hereof.

13. The removal of green forage, hay, fodder, bedding reeds, manure or of such other articles as may be reasonably supposed capable of conveying infection, shall be prohibited from areas of infection, save and except with the special permission of the Administrator.

14. Whenever an area shall have been declared under section 12 hereof, every person within such area, or within such further area as may be specified by Government Notice, owning or in charge of cattle shall, upon the death or slaughter because of disease, suspected disease, or accident, of any such cattle, immediately report such occurrence through the nearest Cattle Inspector, Native Commissioner or Police Officer to the District Veterinary Surgeon.

15. Notwithstanding the provisions of these regulations, it shall be competent for the Chief Inspector of Cattle to authorise and direct the movement of cattle for the purposes of isolating, dipping, quarantine, or any other such objects as may be deemed necessary to prevent or suppress an outbreak of disease.

16. Whenever an area shall have been declared an area of infection or guard area in terms of section 12 hereof, any person who shall allow any cattle to stray or be otherwise removed, except as provided for in these regulations, from any one place within such area to another place, or from a place outside of to a place within such area, shall be guilty of an offence against these regulations.

17. All cattle within the limits of the various commonages and townlands, areas of infection and guard areas as declared under section 12 hereof, or depastured on common grazing ground, shall be dipped or sprayed at least once in every three days, unless the Chief Inspector shall authorise the extension of the time between such dipping or spraying, or the entire suspension of the same.

18. In all areas of infection and guard areas sheep and goats shall be dipped at such periods as may be directed by the Chief Inspector.

19. Whenever the owner, occupier, or manager of a farm shall adopt means of cleansing cattle running thereon, either by spraying, dipping, or by any other method, the Chief Inspector may order any natives or other persons having cattle on the same farm to cleanse such cattle, and the Native Commissioner of the district within which the farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed upon between the said owner, occupier or manager and the said native owners.

20. All permits for the removal of cattle issued under the provisions of the said Ordinance or of any regulations framed thereunder shall specify legibly and clearly on the face thereof the place from and to which such cattle may be removed, the route by which they shall travel, the number and brands of such cattle, the time allowed for the journey, and such other particulars and conditions as it may be deemed expedient to provide.

21. No permit issued for the movement of cattle shall be taken to authorise any trespass in connection with such movement.

22. Notwithstanding the provisions of these regulations, it shall not be lawful for any owner of cattle to allow any such cattle to be on any road, public outspan, commonage, or any property other than that of the owner,

unless they are free from ticks or unless they have been effectively cleansed by dipping, spraying or other process, within fourteen days of being allowed on such road or other place. Any beast having ten or more ticks on it shall not be considered free from ticks.

23. Any person contravening the provisions of these regulations or the conditions set out in permits issued thereunder, shall, where no higher penalty has been by the said Ordinance or any other law provided, be liable in respect of each offence to a fine not exceeding £20, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months.

SCHEDULE "A."

Veterinary Districts of Southern Rhodesia.

(1) *Salisbury.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

32. Battlefields; 33. Hartley and Gatooma; 34. Gadzema Station; 35. Makwiro Station; 36. Norton Siding; 37. Hunyani Tank; 38. 1645½ Peg B. & M. & R. Railways; 39. Salisbury A.; 40. Salisbury B.; 41. Salisbury C.; 42. Salisbury D.; 43. Arcturus; 44. Bromley; 45. Marandellas North; 46. Marandellas South; 48. Headlands Station; 49. Junction Mazoe and Lomagundi Railways; 50. 23-Mile Peg, Lomagundi Railway; 51. Passaford Station; 52. 35-Mile Peg, Lomagundi Railway; 53. Gwibi Tank Halt; 54. Banket, Lomagundi; 55. Eldorado, Lomagundi; 56. Selby Siding; 57. Mazoe; and 58. Kimberley Reefs.

(2) *Bulawayo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

1. Plumtree; 2. Marula Siding; 3. Figtree; 4. Westacre Junction; 5. Bulawayo Area; 6. Heaney Junction; 7. Bembesi Station; 8. Insiza North; 9. Insiza South; 10. Shangani North; 11. Shangani South; 14. Redbank; 15. Nyamandhlovu Station; 16. Malindi Station; 17. Wankies Area; 18. Matetsi Siding; 19. Matopo Terminus; 20. Sabiwa Siding; 21. Gwanda Station; 22. West Nicholson; 23. Belingwe; 59. Essexvale and Balla Balla Areas; 60. Stanmore Siding Area; 61. Filabusi Area.

(3) *Gwelo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

12. Somabula Siding; 13. Gwelo Station; 24. Selukwe Area; 25. Surprise Area; 26. Indiva Siding; 27. Lalapanzi; 28. Iron Mine Hill Siding; 29. Umvuma Siding; 31. Que Que Station.

(4) *Umtali.*

An area comprising the native districts of Umtali, Melsetter, Makoni and Inyanga.

No. 247 of 1915.] [23rd July, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notices Nos. 526 of 1914, 167, 175 and 179 of 1915, and in terms of section 12 of Government Notice No. 50 of 1912, declare the following to be areas of infection and guard areas :—

2. Umtali Native District.

(b) *Guard Area.*

The farms N'odzi and Nyagari and the Penhalonga Valley.

3. Melsetter Native District.

(a) *Areas of Infection.*

(1) Highlands, Rockwood and Joppa Farms.
(2) Clearwater, Nooitgedacht, Randfontein and Avontuur Farms.
(3) Enhoek, Ravenswood, Roslyn, Woodstock, Landsdown, Heilrand and Kenilworth Farms.
(4) Wolvedraai Farm.
(5) Houtberg Farm.
(6) Springfield Farm.

(b) *Guard Area.*

That portion of the native district of Melsetter south of the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri and the Nayanyadzi River.

No. 375 of 1915.] [15th October, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notice No. 194 of 1915 and section 1 of Government Notice No. 247 of 1915, and declare the following areas of infection and guard area in lieu thereof :—

1. Salisbury and Mazoe Native Districts.

(a) *Areas of Infection.*

(1) M.T.C., Gallagher's Lease, Makabusi, Epworth, Adelaide and Glenwood farms.

(2) Sternblick farm.

(3) Bluff Hill farm.

(4) Sigaro farm.

(5) Mabelreign farm.

(6) Borrowdale Estate, Helenvale, Glen Lorne, Luna and Greystone farms.

(7) An area bounded by and including the following farms :—Belford Estate, Belford Estate No. 2, Belford Estate North, vacant land on which the Jumbo Mine is situated, Whitfield, Yarrowdale, 100-acre lots, vacant land, Tjibakwe and Belford Estate No. 3.

(b) *Guard Area.*

An area bounded by and including the following farms :—Bitton, Syston, The Lily, Killiemore, Penrose, Derry, Glen Lussa, Rainham, Gillingham, Park Ridge, Crowborough, Lochinvar, eastern sub-division of Willowvale, Glen Norah, Hopley, Saturday Retreat, Reserve, Odar, Stoneridge, Eyrecourt, Boutelle, Twentydales, Nalire Reserve, Mayfair, Galway Estate, Sebastopol, Gardiner, Father Hartmann's farm, Chishawasha, The Crag, Umritsur, Mount Shannon, Halstead, Chindamora Reserve, Pote, Valeria, Spelonken, Arnold's, Smithfield, Brundret, Spitzkop, Summerdale, Rockwood, Somerset, Southmoor, Howick Estate, Leeuw's Rust, Klein Kopjes, Oude Kraal, Mooi Leegte, and Reserve.

No. 283 of 1915.] [20th August, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the following area of infection and guard areas :—

(a) *Area of Infection.*

The farm Quagga's Hoek, in the native district of Melsetter.

(b) *Guard Areas.*

(1) That portion of the native district of Melsetter north of and including the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri and the Nyanyadzi River.

(2) That portion of the native district of Umtali lying south of the Impodsi River from its junction with the Odzi River to its junction with the Shetora River, thence up the Shetora River to the farm Butler North and including that farm and Banti North.

No. 393 of 1915.] [29th October, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the farm Carrickcreagh, in the native district of Salisbury, to be an area of infection.

No. 394 of 1915.] [29th October, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the following areas of infection :—

(1) Melsetter native district—the farms Rumble Rills, Groenvlei, Cecilton and Quagga's Hoek.

(2) Umtali native district—the farm Penkridge.

No. 400 of 1915.] [5th November, 1915.

AFRICAN COAST FEVER.

TRANSPORT CATTLE.

WHEREAS it is necessary to afford facilities for transport with oxen between Lalapanzi area and Iron Mine Hill area, as described in the schedule to Government Notice No. 387 of 1914, I, under and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," do hereby declare that the above-mentioned areas shall be regarded as one for the purposes of working draught cattle.

No. 438 of 1915.] [26th November, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the farm Ostend, in the native district of Melsetter, to be an area of infection.

No. 381 of 1914.] [3rd September, 1914.

COMPULSORY DIPPING.

UNDER and by virtue of the powers vested in me by section 7 of the "Compulsory Dipping Ordinance, 1914," I hereby declare that the provisions of that Ordinance shall be applied in respect of cattle within the following areas from the date of issue of this Notice, dipping to take place at such intervals as the Chief Veterinary Surgeon shall direct.

The areas under the control of the Municipalities of Salisbury, Bulawayo, Gwelo and Umtali, the Sanitary Boards at Gatooma and Victoria, and the Village Management Boards at Que Que, Melsetter, Penhalonga, Marandellas, Hartley, Enkeldoorn, Avondale, Umvuma, Selukwe and Gwanda.

Further, I do hereby declare that a charge of one penny per head will be made in respect of all cattle dipped at Government dipping tanks, except unweaned calves, for which no charge will be made; and one penny in respect of all horses, mules and donkeys, and ½d. in respect of all sheep.

No. 527 of 1914.] [31st December, 1914.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that within the area defined below, on and after the 1st day of January, 1915, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

An area including the Salisbury native district bounded by and including the following farms:—Lilfordia, Saffron Walden, Kilworth, Porta, Outspan, Clements' Plot, Warwickshire, Oatlands, Amalinda, The Rest, Langford, Saturday Retreat, Odar Outspan, Stoneridge, Longlands, Seki Native Reserve, Dunstan Estate, Banana Grove, Mayfair, Galway Estate, Sebastopol, Caledonia, Hartmans, Chishawasha, Glenlorne, Borrowdale, sections 4 and 1, The Willesden, Lowdale, Ingleborough, Mguta, Great B, Umsasa, Springvale, Passaford, Spa, Fairview, Nalire, Penrose.

No. 70 of 1915.] [4th March, 1915.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notice No. 353 of 1913 and declare that within the area defined below, after date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

An area including parts of the native districts of Bulawayo, Umzingwane, Matopo, Bubi and Bulalima-Mangwe, bounded by and including the following farms:—

Lochard Block, Greenlands, Wessels, Allendale B, Oscardale, St. Ninian's, Fincham's, Inyati Reserve, Lortondale, Wynslay Estate, Greville, that portion of unalienated land lying south of a line drawn from the most westerly beacon of Dollar Block and the north-eastern beacon of Killegar,

Kilspat, Erasmus Block, Portion, Robert Block, Indina, Waterfall, Dingaan, Ramsdale, Pandisi, Umkeen, Scarborough, Devonby, Helenvale, Slight's, Billar's, Craiglee, Bluebonny, Ireland, Welcome, Paul's Rest, McGeer's Luck, Centenary Mission, Maritzburg, Springvale, Outspan No. 3, Tati Road, De Hoop, Anglesea, Mineral King, World's View, Matopo Block, Brethren in Christ Mission Farm, Absent, the unsurveyed land lying north of a line drawn from the south-east beacon of Absent to the south-west beacon of The Range, The Range, Clark's, Swaithe's, Limerick, Pioneer's Rest, Mayhill, Rietfontein, Bradford, Hamilton, Mayfair, York, Indina, Rathline, Westondale, sub-division A of Fochabers, Fochabers, Kodhwayo, Zimbile and Lochard Outspan.

No. 206 of 1915.] [25th June, 1915.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that within the area defined below, on and after the date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

All surveyed farms in the native district of Melsetter south of the farms Stonehenge, Noorutzicht, Lindley, Melsetter Commonage, Reserve, Cambridge and Buiwari, including the Inyorima Reserves and Mafusi Reserve, and excluding the farms Umzelezwe, Nyagadzi, Mhungura, Pangela, Passage, Mangani, Chengwe, Gumera, Umbugu, Nhori, Elongwe and Mamzwera.

No. 271 of 1915.] [13th August, 1915.

COMPULSORY DIPPING OF CATTLE: ENTERPRISE SECTION OF SALISBURY DISTRICT.

IN accordance with the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," notice is hereby given that the owners resident in the area described below have by a majority of votes requested His Honour the Administrator to bring compulsory dipping of cattle into operation in the said area, and that he intends to comply with the said request.

Any person desiring to lodge an objection to the bringing into operation of compulsory dipping as aforesaid shall do so on or before 8th October, 1915.

Description of Area.

An area bounded by and including the following farms:—Halstead, Mount Shannon, The Meadows, Ivofdale, Ivanhoe, Oribi, Colga, Neptune, Mashona Kop, Mashona Vlei, Vuta, Chinyika, Lonely Park, Grazeley, Guernsey, adjoining vacant ground, Cromlet, Father Hartmann, Chishawasha, Stuhm, The Springs, The Grove and Umritsur.

No. 309 of 1915.] [27th August, 1915.

COMPULSORY DIPPING OF CATTLE: MELSETTER AND UMTALI DISTRICTS.

IN accordance with the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," notice is hereby given that the owners resident in the area described below have, by a majority of votes, requested His

Honour the Administrator to bring compulsory dipping of cattle into operation in the said area, and that he intends to comply with the said request.

Any person desiring to lodge an objection to the bringing into operation of compulsory dipping as aforesaid shall do so on or before 28th October, 1915.

Description of Area.

All surveyed farms and the Ingorima and Mafusi Reserves in the native district of Melsetter, excluding Umzelezwe, Nyagadzi, Mhunguru, Pang-la, Passage, Mangani, Chengwe, Gumera, Umbugu, Nhori, Elongwe and Mamzwera; and including the following farms in the native district of Umtali: Tom's Hope West, Steynstroom, Thabanchu, Penkridge, Macandrew's, Cronley and Lisnacloon.

No. 318 of 1915.] [3rd September, 1915.

AFRICAN COAST FEVER. COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that within the area defined below, on and after the date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

That portion of the native district of Melsetter north of and including the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri, and the Nyanyadzi River; and that portion of the native district of Umtali lying south of the Impodsi River from its junction with the Odzi River to its junction with the Shetora River, thence up the Shetora River to the farm Butler North and including that farm and Banti North.

No. 355 of 1915.] [1st October, 1915.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notice No. 527 of 1914, and declare that within the area defined below, on and after date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

An area in the Salisbury and Mazoe native districts bounded by and including the following farms:—Lilfordia, Saffron Waldon, Kilworth, Porta, Reserve, Clement's Plot, Warwickshire, Oatlands, Amalinda, The Rest, Langford, Saturday Retreat, Reserve, Odar, Stoneridge, Longlands, Seki Native Reserve, Dunstan Estate, Banana Grove, Mayfair, Galway Estate, Sebastopol, Gardiner, Gilnockie, Cromlet, Learig, Reserve, Meadows, Mount Shannon, Halstead, western portion of Chindamora Reserve, Pote, Valeria, Spelonken, Arnold's, Smithfield, Brundret, Spitzkop, Summerdale, Rockwood, Somerset, Southmoor, Howick Estate, Leeuw's Rust, Klein Kopjes, Onde Kraal, Mooi Leegte, Reserve, Bitton, Syston, The Lily and Killiemore.

No. 402 of 1915.] [5th November, 1915.

COMPULSORY DIPPING OF CATTLE: ENTERPRISE SECTION OF SALISBURY NATIVE DISTRICT.

UNDER and by virtue of the powers vested in me by section 2 of the "Compulsory Dipping Ordinance, 1914," I do hereby declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

Description of Area.

An area bounded by and including the following farms:—Halstead, Mount Shannon, The Meadows, Ivordale, Ivanhoe, Oribi, Colga, Neptune, Mashona Kop, Mashona Vlei, Vuta, Chinyika, Lonely Park, Grazeley, Guernsey, adjoining vacant ground, Cromlet, Father Hartmann, Chishawasha, Stuhm, The Springs, The Grove and Umritsur.

No. 423 of 1915.] [19th November, 1915.

COMPULSORY DIPPING OF CATTLE: MELSETTER AND UMTALI DISTRICTS.

UNDER and by virtue of the powers vested in me by section 2 of the "Compulsory Dipping Ordinance, 1914," I do hereby declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

Description of Area.

All surveyed farms and the Ingorima and Mafusi reserves, in the native district of Melsetter, excluding Umzelezwe, Nyagadzi, Mhunguru, Pangela, Passage, Mangani, Chengwe, Gumera, Umbugu, Nhori, Elongwe and Mamzwera; and including the following farms in the native district of Umtali: Tom's Hope West, Steynstroom, Thabanchu, Penkridge, Macandrews, Cronley and Lisnacloon.

No. 443 of 1915.] [3rd December, 1915.

COMPULSORY DIPPING OF CATTLE: MARANDELLAS AND SALISBURY DISTRICTS.

IN accordance with the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," notice is hereby given that the owners resident in the area described below have by a majority of votes requested His Honour the Administrator to bring compulsory dipping of cattle into operation in the said area, and that he intends to comply with the said request.

Any person desiring to lodge an objection to the bringing into operation of compulsory dipping as aforesaid shall do so on or before the 4th February, 1916.

Description of Area.

An area bounded by and including the following farms:—Rakodzi, Longlands, Shepparton (portion of Lendy Estate), Progress, Rockery, Shortlands, Rastenburg, Loquat Grove, Cornwall, Norfolk, Middlesex, Kent, Suffolk, Sussex, Rupture, Argosy, Weir, Inandu, Seaton, Rapture, Sunny Fountains, Mangwendi Mission, Retreat and Springvale.

No. 13 of 1916.] [14th January, 1916.

COMPULSORY DIPPING OF CATTLE: SHAMVA AREA, MAZOE DISTRICT.

IN accordance with the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," notice is hereby given that the owners resident in the area described below have by a majority of votes requested His Honour the Administrator to bring compulsory dipping of cattle into operation in the said area, and that he intends to comply with the said request.

Any person desiring to lodge an objection to the bringing into operation of compulsory dipping as aforesaid shall do so on or before the 17th March, 1916.

Description of Area.

An area bounded by and including the following farms:—The Carse, Burnleigh, Woodlands, Ceres, Murgwi, Zombi, Chewarika, Maienzi, Maxton, Lone Star Reserve No. 2, Richlands, M.E.D. Reserve, New Brixton, Dillon, Mullingar, Mumwi, Chipoli, Ellerslie, Wolley, Wapley, Lion's Den, and thence from the south-eastern beacon of Lion's Den up the Poorti River to the north-western beacon of The Carse.

No. 21 of 1916.] [21st January, 1916.

COMPULSORY DIPPING OF CATTLE: SALISBURY, MAZOE AND HARTLEY DISTRICTS.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," to declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

Description of Area.

An area bounded by and including the following farms:—St. Mary's, Stoneridge, Odar, Reserve, Saturday Retreat, Chizanza, Suum Cuique, Arbroath, Langford, The Rest, Amalinda, Oatlands, Warwickshire, Clement's Plot, Reserve, Porta, Lyndhurst, Riverside, Herren Hausen, Lilfordia, Killiemore, The Lily, Ballineety, Fairview, Spa, Passaford, Springvale, Mbebi, Umsasa, Great B, Christon Bank, St. Gerera, Willesden Farm, Borrowdale Estate, Luna, Glen Lorne, Gletwyn, Sternblick, Manresa, Caledonia, Sebastopol, Galway Estate, Mayfair, Nalire Reserve, Buena Vista and Seki Reserve.

No. 22 of 1916.] [21st January, 1916.

COMPULSORY DIPPING OF CATTLE: MAKWIRO AREA, HARTLEY DISTRICT.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," to declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

Description of Area.

An area bounded by and including the following farms:—Umfulia, Dorothy Hill, vacant land, Seigneury Reserve, Zimbo Junction, Serui Drift, Strathmore, Scotsdale, Cape Boys' Reserve, Railway Farm No. 22, vacant land between Railway Farm No. 21 and Spencer, Spencer, Railway Farm No. 23, Woodsgift, Railway Farm No. 25, Southwood, Northwood, Niklot, Rothwell Extension, Hunyani Estate, Hunyani Estate No. 2, Stanhope, Cromdale, Garthnor, Serui, Curlewood, Cotswold and vacant land and farms lying within a line from the most easterly beacon of Cotswold to the north-east beacon of Fort Martin, thence to the south-east beacon of Fort Martin and from there due south to the Umfuli River and down that river to the farm Umfulia.

No. 337 of 1915.] [17th September, 1915.

ENZOOTIC ABORTION.

IT is hereby notified for public information that nothing contained in the several Government Notices declaring certain areas to be actively infected with the disease known as enzootic abortion, for the purposes of the "Animals Diseases Consolidation Ordinance, 1904," and the "Animals Diseases Amending Ordinance, 1911," shall be taken to prohibit the movement of oxen to, from or through such areas, subject to compliance with the laws and regulations governing the movement of cattle.

No. 505 of 1914.] [10th December, 1914.

CLOSING OF GATES ON ROADS, ETC.

UNDER and by virtue of the powers vested in me by section 26 of the "Fencing Ordinance, 1904," I do hereby provide that travellers passing through a gate erected on a public or private road in terms of section 25 of the said Ordinance, and omitting to close such gate after having passed through, shall be liable to a fine not exceeding £10, or in default of payment to imprisonment with or without hard labour for a period not exceeding one month.

No. 23 of 1916.] [21st January, 1916.

"FENCING ORDINANCE, 1904."

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Fencing Ordinance, 1904," to define the area as described hereunder to be a district for the purposes of the said Ordinance and in terms of sections 3 and 4 thereof to bring the provisions of Part I. of the said Ordinance into operation in the aforesaid district from date hereof.

Description of Area.

That portion of the native district of Mazoe bounded by and including the farms Selwood, Marston, Nan Terra, Retreat, Avoca, Nomansland, Glencairn, Vergenoeg and Caledon.

No. 186 of 1914.] [23rd April, 1914.

IMPORTATION OF CATTLE.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel the regulations published under Government Notice No. 128 of 1914, and make the following provisions in lieu thereof :—

1. The importation of cattle will be permitted from the Cape Province, the Orange Free State and the Transvaal on the following terms and conditions :—

(1) A permit shall be required from the Chief Inspector, which may contain such conditions as shall from time to time appear expedient.

(2) The importation of cattle with more than two permanent central incisor teeth shall not be permitted, except that animals entered in the South African Stud Book or the appendix thereto, with not more than the first and second pairs of permanent incisors, may be imported.

(3) Applications for permission to import shall be in the form "A" attached hereto, and accompanied by a declaration in the annexed form "B."

(4) All importations shall be by rail, and for the purposes of importation, Bulawayo shall be the port of entry.

(5) All cattle imported in terms of these regulations shall, on arrival at Bulawayo, Salisbury or Umtali, be submitted to such examination or tests as the Chief Inspector may direct. If such examination or tests disclose the existence of any destructive disease, the cattle shall be immediately destroyed and the carcases thereof disposed of in such a manner as a Government Veterinary Surgeon may authorise or require. The Chief Inspector may permit of the age restriction and the tests aforesaid being dispensed with in the case of cattle in transit by rail to any place beyond the borders of Southern Rhodesia.

(6) All expenses or losses incident to quarantine, examination, testing or destruction as aforesaid shall be borne by the owner of the cattle.

2. The importation of cattle from the United Kingdom of Great Britain and Ireland, the United States of America, the Kingdom of the Netherlands and Germany will be permitted under the following terms and conditions :—

(1) Importation shall be through and direct from the ports of Cape Town or Port Elizabeth, and there shall be a consignment note or other satisfactory evidence that cattle so imported have come direct from one of the above-mentioned countries.

(2) The provisions of sub-sections (1), (5) and (6) of section 1 hereof shall apply to importations in terms of this section.

3. Any person introducing cattle in contravention of these Regulations, or failing to comply with any of the conditions attached to permits to import, or furnishing applications, declarations, or other necessary documents known to be false in any material particular, or failing to comply with all lawful directions as to quarantine, examination, testing, destruction or disposal of carcases, shall be liable to a fine not exceeding £20 for each animal in respect of which such offence shall have been committed, and in default of payment to imprisonment with or without hard labour for any period not exceeding six months, unless higher or greater penalties shall have been provided for such offences by the "Animals Diseases Consolidation Ordinance, 1904"; provided, however, that the penalties imposed by these Regulations shall not exempt any cattle from destruction in terms of the aforesaid Ordinance.

ANNEXURE "A."

APPLICATION FOR CATTLE IMPORTATION PERMIT.

1. Applicant's Name and Address.....
2. Number and Class of Cattle to be imported.....
3. Area or Farm and District where Cattle are at present located.....
.....
4. Area or Farm and District to which Cattle are to be moved.....
.....

Applicant's Signature.....

Date.....

Application.....

Permit No.....

ANNEXURE "B."

I, ... residing on the farm ..... in the district of ..... do solemnly and sincerely declare that the ..... (number in writing) animals also enumerated below have been in my possession since birth, and that Lungsickness (Contagious Pleuro-Pneumonia) has not existed amongst any of my cattle, nor on my farm, during the last four years, and that these animals have never been exposed for sale in any public market or stock fair.

Number of Animals ..... Bulls ..... Heifers .....

Breed .....

Seller's Name and Address .....

.....

Purchaser's Name .....

Place in Southern Rhodesia to which animals are being sent

.....

And I make this solemn declaration conscientiously believing the same to be true.

.....

Declared to at ..... on this ..... day of..... before me,

.....

Resident Magistrate for the District of .....

IMPORTATION OF STOCK FROM THE PROVINCE OF THE CAPE OF GOOD HOPE.

WITH reference to Departmental Notice of 28th February, 1912, it is hereby notified that the said Notice is cancelled, and importation of stock will now be permitted, in terms of Government Notice No. 110 of 1908, from the Province of the Cape of Good Hope, with the exception of the following districts :—

Komgha	Stockenstroom
East London	Queenstown (Gwatyu Ward only)
Peddie	Glen Grey
Victoria East	Maclear
Kingwilliamstown	Elliot Slang River
Stutterheim	Wodehouse
Cathcart	Barkly East

No. 364 of 1914.] [27th August, 1914.

REGULATIONS GOVERNING IMPORTATION OF LIVE STOCK, ETC.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended from time to time, I do hereby cancel the regulations published under Government Notices Nos.

295 and 394 of 1908; 38, 61 and 263 of 1909; and 60 of 1911 and 188 of 1912, 47 of 1913, and so much of any other regulations as may be repugnant to or inconsistent with the subjoined regulations, which are hereby declared to be of full force and effect.

1. The importation of the following animals from the respective countries or districts enumerated is prohibited, owing to the existence or supposed existence of destructive diseases affecting the said animals in the said countries :—

(1) All animals and dogs as defined by the aforesaid Ordinance from—

India,
Mauritius,
Persia,
British Burmah,
Assam,
China and bordering countries, including Korea,
French Indo-China,
Dutch East Indies,
Hong-Kong,
Federal Malay States,
The Philippines,
Zanzibar,

and all other countries where surra is known or suspected to exist.

(2) Pigs from the Union of South Africa, the Bechuanaland Protectorate, the Tati Concession, and other countries in which swine fever exists or is suspected to exist, subject, however, to the exceptions contained in the proviso to this section.

(3) Dogs from the territories of Northern Rhodesia and Portuguese East Africa, subject, however, to the exceptions in the proviso of this section.

(4) Sheep and goats from the districts of Albany, Alexandria, Bathurst, Bedford, East London, Fort Beaufort, Humansdorp, Jansenville, Kingwilliamstown, Komgha, Peddie, Somerset East, Stockenstroom, Uitenhage and Victoria East, in the Cape Province; the districts of Barberton, Lydenburg, Marico, Pretoria, Rustenburg, Waterberg and Zoutpansberg, in the Transvaal; Swaziland, Portuguese East Africa, Northern Rhodesia.

Provided, however—

(a) that the Chief Inspector may at his discretion permit the importation of pigs, sheep and goats from the above-mentioned places on production of a certificate signed by a duly authorised Government Veterinary Officer in the form of Schedule "A" attached hereto;

(b) that the importation of dogs required for scientific purposes only may be permitted from the places mentioned in sub-section (3) hereof, by the Chief Inspector, in writing, subject to such conditions as may be imposed by him;

(c) that dogs, sheep, goats and pigs from countries from which importation is permitted may be introduced *via* the port of Beira, provided that all such animals shall be transferred directly after disembarkation to the railway trucks at Beira, and conveyed thence to Umtali without leaving the said trucks.

2. The areas set out in Schedule "B" hereto are hereby appointed for the depasturing and quarantining of animals for slaughter in connection with the places therein mentioned.

3. The several districts of Southern Rhodesia are hereby declared to be an area infected with scab amongst sheep and goats, and the movement of all sheep and goats from any farm to beyond the limits thereof, or from their usual grazing ground within the limits of any town lands or native

reserves to any other place, is prohibited, except under the written permit of an Inspector or Sub-Inspector. Such permit shall set forth the number and description of animals to be moved, the route they shall travel, and the period for which the permit shall be in force. In cases where it may be necessary or desirable, the person to whom such permit is issued may be required to cause the animals referred to therein to be dipped before being moved.

4. The introduction of sheep and goats is prohibited except—

(a) as specially provided for by section 1 hereof;

(b) from places not mentioned in section 1, if accompanied by a certificate in the form set out in Schedule "C" hereof.

5. The owner or person in charge of any horse, mule or donkey entering Southern Rhodesia by rail shall immediately report such arrival to the Veterinary Office at Salisbury, Bulawayo and Umtali respectively, and no such animal shall be detrained at any intermediate station without the written authority of a Government Veterinary Surgeon.

6. The owner or person in charge of any horse, mule or donkey entering Southern Rhodesia by road shall immediately report such arrival at the Police Camp nearest to the place where such entry is made, and the officer in charge of such Police Camp shall immediately report to the Veterinary Department, which shall direct what steps are to be taken to test such animals with mallein, as in the following clause provided.

7. All horses, mules and donkeys, upon entering Southern Rhodesia, shall be tested with mallein, and the owner or person in charge of such animals shall in all respects carry out the lawful directions of the Inspector while such animals are being tested; provided that this regulation shall not apply to animals in transit through Southern Rhodesia which are not detrained *en route*.

8. Horses, mules and donkeys lawfully in this Territory, and required for purposes necessitating frequent crossing of the border, may be allowed to so cross on such terms as to registration, branding, testing and conditions as the Chief Veterinary Surgeon may from time to time deem expedient to prescribe.

9. An Inspector may direct the thorough cleansing and disinfecting of trucks which may be reasonably suspected of being sources of infection of any destructive disease, and may direct the destruction of truck fittings, fodder, excreta, or other matter or thing which may be reasonably calculated to convey such infection.

10. Any persons contravening the provisions of these regulations, or the instructions or directions given in terms of these regulations, shall be liable in respect of each offence to a penalty not exceeding twenty pounds, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months, unless where more or heavier penalties have by the aforesaid Ordinance, or by other regulations framed thereunder, been expressly provided.

SCHEDULE "A."

Certificate.

Issued under provisions of section 1, Government Notice No. 364 of 1914.

This is to certify that the animals enumerated below are, in my opinion, free from any destructive disease, including heartwater; and, to the best of my knowledge and belief, have not been in contact with any infected animals.

nor come from, or through, a locality where any such disease is known to exist or has existed for twelve months from date hereof.

Date....., 19...

Place .....

.....

Signature of
Government Veterinary Surgeon.

Number and general description of animals :

.....Pigs, ...Sheep, ...Goats.

Place from which animals are to be sent :

.....

Owner's name and address :

.....

.....

Place in Southern Rhodesia to which it is desired to send the animals .....

SCHEDULE "B."

Description of areas set apart for depasturing and quarantining of animals for slaughter.

Salisbury.—A fenced piece of land, 400 acres in extent, situated on the Makabusi River below Maggio's plot, within the Salisbury commonage and towards the southern boundary thereof.

Bulawayo.—That piece of fenced land situated on the Bulawayo commonage between the railway line, to the south, and the Solusi road, adjoining and to the south-west of the Government dipping tank, in extent 1,000 acres more or less.

Gwelo.—Starting from a point where the Ingwania road crosses the railway, along this road past the sanitary stables to a point a quarter of a mile west, thence in a line parallel with the railway to the Gwelo River, thence along the river to the commonage beacon No. 11, thence in a straight line to the Shamrock road where it is intersected by the Scout's Spruit, thence along the Shamrock road to where it joins the Main Street extension, thence along this to the railway line, and down this to the starting point.

Umtali.—A piece of fenced land situated on the old Darlington Farm section of the Umtali commonage.

Penhalonga.—A piece of fenced land situated on plot No. 2, Imbeza plots.

Selukwe.—A piece of fenced land, in extent about 300 acres, situated on the farm Sebanga and adjacent to the township of Selukwe.

SCHEDULE "C."

I, ... residing at .....

in the district of... ..... in the.....

Colony, do solemnly and sincerely declare that the animals enumerated below are free from any contagious disease, including scab, and have not been in contact with any infected animals within six months from date hereof, and that, to the best of my knowledge and belief, such animals, in

travelling to.....† station, will not come in contact with any animals amongst which scab or any other contagious disease exists.

And I make this solemn declaration conscientiously believing the same to be true.

.....

Declared to at.....on this.....

day of.....before me.

.....

Magistrate, Government Veterinary Surgeon, Scab Inspector, or Police Officer of district from which animals are being sent.

Number and general description of animals being sent.....

Owner's name and address.....

.....

Place in Southern Rhodesia to which animals are being sent.....

† Station within Colony of origin.

No. 442 of 1914.] [15th October, 1914.

ISSUE OF PERMITS FOR THE REMOVAL OF STOCK.

IT is hereby notified for public information that His Honour the Administrator has approved of members of the British South Africa Police issuing permits for the removal of cattle, sheep and goats at the undermentioned stations when no Inspector or Sub-Inspector of Cattle is available :—

Nyamandhlovu.
Gwanda.
Plumtree.
Fort Rixon.
Belingwe.
Inyati.
Fort Usher.
Mphoeng's.
Holi.
Filabusi.
Gwaai.
Figtree.
Umvuma.
Que Que.

No. 410 of 1915.] [12th November, 1915.

ISSUE OF PERMITS FOR REMOVAL OF STOCK.

IT is hereby notified for public information that His Honour the Administrator has approved of members of the British South Africa Police issuing permits for the removal of cattle, sheep and goats at the undermentioned stations when no Inspector or Sub-Inspector of Cattle is available :—

Mazunga.
Makwiro.
Banket Junction.
Makaha.
Tuli.
Sinoia.
Buhera.

No. 12 of 1916.] [14th January, 1916.

ISSUE OF PERMITS FOR REMOVAL OF STOCK.

IT is hereby notified that His Honour the Administrator has approved of members of the British South Africa Police issuing permits for the removal of cattle, sheep and goats at the Beatrice Mine.

No. 375 of 1912.] [28th November, 1912

IMPORTATION OF POULTRY.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended by the "Animals Diseases Amendment Ordinance, 1910," I do hereby declare and make known that the following regulations shall be in force and effect from date of publication hereof :—

(1) All poultry imported by rail shall be inspected by an Inspector or Sub-Inspector at Plumtree, Bulawayo or Umtali.

(2) Should any consignment of poultry shew symptoms of disease, or should such Inspector or Sub-Inspector have reason to believe that any disease exists in, or that infection is likely to be conveyed by such consignment, he may order the detention and isolation of the whole consignment for such period as he may deem necessary.

(3) The Chief Inspector may order the destruction of all poultry which he has reasonable grounds for believing to be diseased or likely to convey infection.

THE following extract from Live Stock Regulations, printed on page 150 of the South African Railways Official Tariff Book, is published for general guidance :—

Poultry are not accepted by rail unless they are placed in a crate and the following conditions are complied with :—

(1) The size of the crate shall be 3 feet 6 inches by 2 feet 9 inches external floor dimensions; for turkeys and geese the height shall be 30 inches: and for fowls, ducks, and poultry of a like size, the height shall be 20 inches.

(2) Each crate must contain two drinking vessels filled with pure water, such vessels to be not less than five inches in depth, of the unspillable type, one being fixed at opposite corners of the coop.

(3) Each crate shall contain two receptacles for food of a suitable size, filled with suitable food other than whole maize.

(4) The birds must not be over-crowded in the crates, and in no case must there be more than 20 fowls, ducks or other birds of a like size, or ten turkeys or geese

(5) Different species of birds must not be placed in the same coop.

Unless coops, crates, and the like are strong enough to bear ordinary transit handling, the Administration will not accept responsibility for loss.

SUMMARY OF THE GAME LAWS.

Game is divided into three distinct classes, described as follows :—

(a) Birds and Small Buck.

(b) Bushbuck, Hartebeest, Impala, Lechwe, Pookoo, Roan and Sable Antelope, Sitatunga, Tsessebe, Waterbuck, and Wildebeest.

(c) Royal Game, which includes Eland, Elephant, Giraffe, Gemsbok, Hippopotamus, Inyala, Koodoo, Ostrich, Rhinoceros, Springbuck and Zebra.

The shooting season for Class "A" is as follows :—

In Mashonaland :

Birds from 1st May to 30th September.
Small Buck from 1st May to 31st October.

In Matabeleland :

Birds and Small Buck from 1st May to 31st October.

To shoot in Class "A" a licence costing £1 per annum is required. This entitles holders to hunt in both Provinces during the open season.

Class "B."—The season opens on 1st July and closes on 30th November in both Provinces. The licence fee is £25 for non-residents and £5 for persons having their domicile in Southern Rhodesia. This licence entitles the holder to shoot up to 15 head, which number may be increased to a total of 25 upon payment of a further sum of £15 in the one case and £5 in the other.

Class "C."—The Administrator may, if he is satisfied that the animals are actually required for scientific purposes, grant to the holder of a game licence permission to shoot or capture any of the species included in this Class. Such permit requires a £5 stamp. Applications in writing, together with proof of *bona-fides*, should be addressed to the Director of Agriculture.

Game for Farming Purposes.—Permits may be granted for the capture of Eland, Ostrich, Zebra or other animals for the purposes of breeding or farming. Such permits require a stamp of the value of £1 and remain in force for six months. Application, accompanied by a sworn declaration, should be made through the Director of Agriculture or the Civil Commissioner of the district.

Game Injuring Crops.—The occupier of any cultivated land or any person acting under the authority of such occupier, may at any time destroy game actually doing damage on such land.

Elephants on Occupied Farms, Melsetter.—The destruction of Elephants when found on occupied farms on the High Veld in Melsetter District is authorised (*vide* Government Notice No. 284 of 1908).

Open areas.

The shooting or capturing of all classes of game with the exception of ostriches and other birds classified as game is permitted within the following areas in the Hartley district and the Sebungwe district until further notice.

Hartley District.—From the railway bridge on the Umfuli River, thence north-westwards along the Umfuli River to where it joins the Umniati River, thence southwards along the Umniati River to where it joins the Umsweswe River, thence eastwards along the Umsweswe River up to the drift at the Lydia Mine, thence along the old road from Lydia Mine to Etna Mine and to Inez Mine, thence northwards along the road from Inez Mine to Hartley, thence in the direction of the railway bridge to the starting point on the Umfuli River.

Sebungwe District.—From the confluence of the Sengwe and Lutope Rivers up the Lutope to its headwaters, thence in a south-east and easterly direction following the southern edge of the escarpment, leaving Meare's farm to the south, to the Mafungabusi Peak, thence northwards along the escarpment to the Njelele River, and down that river to its confluence with the Sanyati River, thence northwards down the Sanyati River to its confluence with the Piriwiri River, thence direct in a north-westerly direction to Picaninyemba, and thence along the footpath to Nenyunka on the Sengwe River, thence southerly up the Sengwe River to its confluence with the Lutope.

Lomagundi.—An area bounded by a line drawn from the junction of the Angwa and Mkwichi Rivers up the Angwa to the point where the Sinoia-Urungwe Road crosses that river; thence along this road in a south-easterly direction to the Hunyani River; thence down that river to a point opposite Mokore Hill; thence westerly direct to the point first named.

Elephants, Hartley District.—Notice No. 168 of 1914 permits the shooting or capturing of elephants on or within five miles of the farm Walden, in the Hartley District, for a period of one year from 9th April, 1914.

The game specified may be shot in these open areas without a licence.

Game in Class "A" may be hunted in the close season until further notice on private land in the Melsetter district by holders of a licence.

Protected Areas.—No game may be hunted or killed within the limits of the Commonage or Townlands of Bulawayo and within a radius of two miles of the Court House, Gwelo, or within the Urungwe Game Sanctuary, as defined by Government Notice No. 237 of 1906.

"Locust Birds" are strictly protected, *vide* Government Notice No. 390 of 1912.

Export of Game.—No living Game or the Eggs of any Game Birds may be exported beyond the limits of Southern Rhodesia without a written permit.

Shooting on Private Land.—A licence does not entitle the holder thereof to shoot on private land without the permission of the land-owner.

Farmers Shooting Game on their Farms.—By taking out a special £1 licence, farmers may at any time shoot any game on their land. "Game" does not include any birds, except ostriches.

No. 390 of 1912.] [19th December, 1912.

PROTECTION OF LOCUST BIRDS.

UNDER and by virtue of the powers vested in me by the "Game Law Consolidation Ordinance, 1906," I do hereby declare that the following Locust Birds :—

(1) Great Locust Bird or White Stork (*Ciconia alba*);
(2) Lesser Locust Bird or Nordmann's Pratincole (*Glareola melanoptera*);
(3) Small White Heron or Cattle Egret (*Bubulcus ibis*);
(4) Wattled Starling (*Dilophus carunculatus*);

are added to class "A" of the said Ordinance, and shall be strictly protected, and not hunted or destroyed, throughout Southern Rhodesia for a period of five years from date hereof.

No. 171 of 1915.] [21st May, 1915.

PROTECTION OF GAME ON COMMONAGES.

UNDER and by virtue of the powers conferred upon me by the "Game Law Consolidation Ordinance, 1906," I do hereby declare that up to the 30th day of April, 1916, all game within the limits of the commonage or townlands of Umtali shall be strictly protected, and shall not be hunted or destroyed.

No. 249 of 1908.] [27th August, 1908.

PROTECTION OF TREES.

IT is hereby notified for public information that any person who shall cut down for use as fuel, or for any other purposes than *bona-fide* farming, mining or manufacturing purposes, or cause to be so cut down the "Wild Westeria" (native name M'Pakwa or M'poea) tree, will be liable to prosecution for contravention of the provisions of the Forest and Herbage Preservation Act, 1859, and upon conviction to a fine not exceeding £100, or to imprisonment with or without hard labour for a term not exceeding six months, or to such fine and imprisonment, or to such imprisonment without a fine.

No. 456 of 1915.] [10th December, 1915.

AGRICULTURAL STATISTICS.

UNDER and by virtue of the powers conferred on me by the "Agricultural Statistics Ordinance, 1914," I do hereby make further provision for the collecting of statistics or estimates in terms of the said Ordinance.

1. Statistics shall be collected by the Director of Agriculture in relation to live stock and areas under cultivation.

2. The form set out in the Annexure hereto shall be used for the purpose of collecting such statistics, and shall be completed, in accordance with the instructions accompanying the same, by all persons in charge of live stock, farms or estates, whether as owners, lessees, managers, servants or occupiers, or acting on behalf of such persons, and transmitted to the Director of Agriculture not later than the date fixed in the instructions accompanying the said form.

3. Any person who without reasonable cause makes default in complying with the requirements of the last preceding section shall be liable on conviction to a fine not exceeding fifty pounds, or, in the case of a continuing default, to a fine not exceeding one pound for every day during which the default continues.

ANNEXURE.

SOUTHERN RHODESIA.

AGRICULTURAL STATISTICS ORDINANCE, 1914.

LIVE STOCK

(on the farm on the 27th December, 1915).

	Number at date.	Number died during past year.
Cattle—		
Cows and Heifers over one year old	.....	.....
Heifers under one year old ...	.....	.....
Bulls in use for stud purposes	.....	.....
Working Oxen	.....	.....
Other Bulls, Oxen (all ages) and Bull Calves ...	.....	.....
Horses	.....	.....
Mules	.....	.....
Donkeys	.....	.....
Sheep—Merino	.....	.....
All other	.....	.....
Goats	.....	.....
Pigs	.....	.....
Poultry, all kinds	.....	.....
Eggs sold during last 12 months	.....doz.	
Cream ,, ,,	.....lbs.	PEDIGREE CATTLE. Kindly state the breed or breeds, sex and numbers belonging to each, of any pure-bred cattle on the farm at the above date ....
Milk ,, ,,	.....lbs.	
Butter ,, ,,	.....lbs.	
Wool ,, ,,	.....lbs.	

N.B.—In reckoning the quantity of cream and milk sold, please note that six ordinary whisky bottles equal one gallon and one gallon equals ten lbs.

CROPS: Preliminary Estimate for Season 1915-16.

Total Area under cultivation.	Area under Maize.	Area under Tobacco.
.....Acres.	.....Acres.	.....Acres.

N.B.—In calculating acreage, please note that the length multiplied by the breadth in yards or paces, divided by 4,840, gives the number of acres. That is, for instance, 70 x 70 or 60 x 80 or 40 x 120 yards or paces approximately equals 4,840 square yards or one acre.

Name* of Farm (or Farms) covered by the above return.....

Signature .....

Full Postal Address.....

.....

*That is, the original and officially-recognised name which appears on the title deeds and diagrams.

No. 8 of 1916.] [7th January, 1916.

APPLICATIONS FOR USE OF WATER

in terms of Chapter I. of the "Water Ordinance, 1913."

IT is hereby notified that the following applications have been made, in terms of the "Water Ordinance, 1913," for authority to use water :—

Name of applicant.	From what river.	Native district of	For the purpose of irrigating a certain portion or portions of the
Knight & Folkestad -	Umfuli	Hartley	Farm Hippovale
B.S.A. Company -	Umtali	Umtali	,, Premier Estate
Dr. T. F. McDonnell -	Mazoe	Mazoe	,, Avoca
A. Moorcroft -	,,	,,	,, Barassie
Rhodesia Lands -	Wakatai	,,	,, Belford Estate
Rhodesia Lands -	Marodzi	,,	,, Glendale
H. B. Christian -	Umwindzi	Salisbury	,, Ewanrigg
J. M. Moubray -	Mkuru	Mazoe	,, ChipoliWest
J. M. Moubray -	Mazoe	,,	,, Dillon and Chipoli
B.S.A. Company -	,,	,,	,, Smithfield
B.S.A. Company -	,,	,,	,, Brundret

Any person or persons whose rights may be affected thereby are hereby called upon, in terms of the regulations published under Government Notice No. 439 of 1915, to lodge, within three months from the date hereof, at the office of the Water Registrar, Salisbury, from whom further particulars are obtainable, their objections (if any) to the granting of these applications, together with a full statement of the grounds for such objections.

Department of Posts and Telegraphs,

Southern Rhodesia.

Postal Notice No. 12 of 1913.

AGRICULTURAL PARCELS POST.

IT is hereby notified for public information that, on and after the 1st August, 1909, any article produced, and, if manufactured, produced and manufactured within Southern Rhodesia may be transmitted by Agricultural Parcels Post at the reduced rate of threepence per lb. or fraction thereof, up to a limit of eleven lbs. in weight.

The Agricultural Parcels Post is designed to bring the producer into direct communication with the consumer, and is available for the transmission of :—

Biscuits	Dried Meats	Plants
Bread	Eggs	Poultry
Butter	Flour	Seeds
Confectionery	Flowers	Sugar
Cigarettes	Honey	Tobacco
Dried & Bottled Fruits	Jam	Wool Samples

and other articles produced within Southern Rhodesia. It does not extend beyond the borders of Southern Rhodesia.

The senders of articles at the reduced tariff applicable to the Agricultural Parcels Post will be required to sign a declaration that the contents are the *bona fide* produce of Southern Rhodesia.

The limits of size and weight, and the general regulations, are those applicable to the Inland Parcels Post.

G. H. Eyre,
Postmaster General.

General Post Office, Salisbury,
31st March, 1913.

RHODESIA

Agricultural Journal.

ISSUED BY

The Department of Agriculture,

SALISBURY, RHODESIA.

ADVERTISEMENTS.

The Journal is issued every alternate month.

Application for advertising space should be addressed to the Editor. The rates are as follows, *per issue*:—

Position.	Whole page. £ s. d.	Half page. £ s. d.	Quarter page. £ s. d.
Inner pages - -	**2 0 0**	**1 5 0**	**0 15 0**
Outer cover (back) -	**4 0 0**	—	—
Inner covers (back and front) and page facing Contents	**3 0 0**	**1 15 0**	**1 0 0**

A discount of 10 per cent. will be allowed for standing or consecutive advertisements running through six issues. Remittances, and electros where desired, should accompany orders. The right is reserved to discontinue the insertion of standing or consecutive advertisements should payment beyond the second issue be delayed.

The right of approval of all advertisements by the Director of Agriculture is reserved, and his decision as to the acceptance or rejection is final.

An additional charge may be made for advertisements printed in special type, equal to any additional charges made by the printers for setting up same.

Advertisements will be accepted from *bona fide* farmers wishing to effect sale, purchase or exchange of produce, live stock or farm implements, at a minimum charge of 2/6 per insertion of 20 words. Extra words will be charged for at the rate of 1/- for every 10 words.

Spring Grange Homestead.

Imported Hereford Heifers, Spring Grange.

THE RHODESIA

Agricultural Journal.

Edited by the Director of Agriculture,
assisted by the Staff of the Agricultural Department.

PUBLISHED BI-MONTHLY.

VOL. XIII.—No. 2.] APRIL, 1916. [5s. per annum.

Editorial.

Correspondence on subjects affecting the farming industry of Southern Rhodesia is invited. Enquiries will be replied to direct, or through the medium of the JOURNAL. *An interchange of ideas and suggestions between farmers will be particularly welcomed. Contributions of a suitable nature for insertion in this* JOURNAL *will be much appreciated. All communications regarding these matters, and advertisements, should be addressed to the Editor, Department of Agriculture, Salisbury.*

THE FARMERS' CONGRESS.—The Thirteenth Annual Congress of the Rhodesia Agricultural Union was opened in Gwelo on the 15th March, and sat until the evening of the 17th. Seventy delegates from farmers' associations were present, including for the first time a representative of Northern Rhodesia. His Honour the Administrator and Mrs. Chaplin and His Honour the Resident Commissioner attended, and there were also present, on behalf of the Government, the Treasurer, the Chief Native Commissioner, the Acting Director of Education, the Chief Veterinary Surgeon, the Secretary of the Department of Agriculture, with five other

officers of that Department. The General Manager of Railways, the Manager of the Native Labour Bureau, the Manager of the B.S.A. Company's estates and the Manager of the Farmers' Co-operative Society also attended. Four members of the Legislative Council took part in the discussions, namely, Messrs. Cleveland, Cripps, Garvin and McChlery, and many citizens of Gwelo attended, including Mrs. Hurrell (the Mayoress) and other ladies, the Magistrate, and the Deputy Mayor.

The Congress was opened by the Administrator in a speech in which he treated, briefly but clearly, a number of subjects of interest to the farming community. He congratulated the farmers and the country that considerable progress had been made during the past year in spite of all difficulties. The Government could not do all it would like to help, but it did its best. A step had been made in the direction of solving the problem of export when local production outstripped local requirements. He looked forward to an expanding business in the new direction of sending slaughter cattle to the Union. He was glad to see much activity in the matter of co-operation, which the Administration would gladly facilitate. He hoped that something would come of the proposed canning factory as another channel for disposal of surplus products. He marked with pleasure the growth of the cattle industry, as shewn by the latest figures giving estimated totals of herds in different districts, which he read. He dealt at length with the rival contentions as to whether the Beit Bequest money should be handed over as a free gift to the people, and confessed that his sympathies were with that view, while admitting that much could be said for the contrary view, which was fortified by legal opinion, namely, that the capital should be maintained intact, and only the income dealt with by the trustees. He pointed out that these two policies could not both be carried out. Finally, he stated that it was impossible for the trustees to realise securities, if they wished to do so, at the present time, and that they had no power to borrow.

With regard to the crops and the possible shortage of native food, humane principles would not be departed from; where natives had money they would be allowed to pay for

grain, and in other cases "some effort should be made to obtain some return in the shape of work." He did not think there was the remotest chance of new railway construction during the present year. In respect to cattle diseases, he felt that the position was improving, and that as a matter of fact conditions in this country were better than in other cattle countries. With regard to bacteriological research, everybody concerned was at one as to the advantage and desirability of making progress in that direction with the least possible delay.

After speaking on the proposed amalgamation of Southern and Northern Rhodesia, His Honour mentioned that the B.S.A. Company was contemplating certain arrangements for facilitating the immigration of a good class of settlers at the end of the war. On the subject of the war, he felt that Rhodesia had played no unworthy part, and he thought, without boasting, that "we have sent a greater proportion of our manhood to the war than any other territory in the Empire." At the front Rhodesians had made a reputation which would not be easily forgotten.

After wishing the members success in their deliberations, the Administrator declared the Congress open.

It was decided that the next meeting of the Congress should be held in Umtali, and Mr. E. A. Hull was unanimously elected President.

Topics Discussed.—The agenda paper included no less than fifty-four distinct items, some of them divided into several sub-heads. It will be understood, therefore, that the field covered was a wide one, ranging, as it did, from district pounds to high politics. Although the constitution of the Union is intended to exclude, as a rule, the discussion of political subjects, there is a special clause empowering Congress assembled to decide to the contrary, if it wishes. A resolution dealing with the proposed amalgamation of Southern and Northern Rhodesia was challenged under this rule, but Congress, by the required majority, decided to discuss it, and the whole of one evening was devoted to this subject. It is impossible to draw a hard and fast line between political subjects and those which are strictly non-political. Indeed, many matters of peculiar interest to the farmers, in so

far as they at the same time vitally affect general national prosperity, must necessarily verge upon the political, and it would be futile to attempt to prohibit their discussion in the annual Farmers' Parliament.

Many very interesting questions affecting the cattle industry were raised. There was the proposal to open a Rhodesian Stud Book separate from the South African Stud Book. Much appreciation was expressed of the new channel for the disposal of surplus stock by sending slaughter cattle from Matabeleland to Johannesburg, and the suggestion that permission should be given for pedigree imported stock in the Union to be exported to Rhodesia after a period was favourably received. Once again the farmers emphasised their anxiety that the work of bacteriological research should not be hindered for lack of accommodation and material, thereby lending their support to the intentions of the Government. A feeling was expressed that the Compulsory Dipping Ordinance of 1914 should be extended in scope in the direction of Government assistance towards the expense of building dipping tanks, and a complaint was made that the Ordinance had not been published early in this *Journal*. As a matter of fact, the law in question was fully explained, by means of a special article, in the *Journal* of August, 1914—that is, within a month of its promulgation. A well-thought-out scheme for the establishment of a meat canning factory was submitted to Congress, and was so heartily welcomed that one is justified in believing that this promising plan for the enlargement of the cattle industry will come into effect in the near future.

The problem how best to improve education in rural districts received a good deal of attention, and a most exhaustive and instructive debate on the subject took place. We cannot doubt that when better times arrive and it becomes possible to initiate the system of farm and trade schools, a great step will be taken towards solving the difficulty.

Supply of Dipping Material.—Owing to the shortage in the supply of cattle dip, arrangements have been made by the Government for the distribution

of arsenite of soda, of which fortunately a stock intended for locust destruction is stored by the Department of Agriculture. Cattle owners will therefore be able to prepare that efficacious dipping solution known as Natal Laboratory Dip. Messrs. W. J. Woods & Co., Salisbury, have been supplied with a limited quantity of the material from the stock in hand for sale to the public at the rate of 50s. per 100 lbs. Applications for purchase of same should therefore be made to this firm.

The arsenite referred to contains on the average 60 per cent. arsenic, that is 20 per cent. less than that generally used for preparing laboratory dip, consequently a larger amount must be used for making the standard solution.

Full directions as to quantities and methods of preparation are given below.

The arsenite is packed in drums containing 56 lbs., and will not be sold or distributed except in the unbroken drums, and only in such quantity as is necessary to carry the individual over until a supply of dip is available.

Cattle owners are strongly advised to provide themselves with a reliable set of scales and weights, as it is essential that the exact quantity of arsenite should be added when additional fluid is required in the tank. The quantity should on no account be estimated, guessed or approximated by any means whatever. They are further warned that the utmost care is required in handling and storing this most dangerous material, which should, whether in broken or unbroken drums, be kept under lock and key.

The following instructions for the preparation of Natal Laboratory Dip are taken from Lieut.-Col. Watkins Pitchford's paper on "Dipping and Tick-Destroying Agents," with the exception that the quantity of arsenite of soda is increased to make up for the lower grade available:—

The following are the ingredients:—

3-day Dip.—5 lbs. 5 ozs. arsenite of soda
1 gal. paraffin
3 lbs. soft soap
400 gals. water.

7-day Dip.—10 lbs. 10 ozs. arsenite of soda
2 gals. paraffin
5½ lbs. soft soap
400 gals. water.

Dissolve the soap and arsenite separately in a sufficient quantity of hot water; add the soap solution to the paraffin, and beat into an emulsion; then add water to make up to 400 gallons, stirring vigorously the while.

If, however, it is found inconvenient to use heat in the preparation of the dip as above, the dipping fluid may be prepared as follows:—

In the case of the 3-day dip, take the 3 lbs. of soap, p in a bucket, and fill up with water (about 3 gallons); the s should then be broken by the hand into small pieces. this way, and by continuous stirring, the 3 lbs. of soap ca dissolved in about fifteen minutes. Then add the paraffin as above and beat into an emulsion. Take, in a similar manner the 5 lbs. 5 ozs. of arsenite, which will be found to become dissolved in about the same time with constant stirring.

This solution, together with the emulsion, should then placed in the mixing tank and water added, with constant stirring, up to 400 gallons. This quantity may then be allowed to run into the dipping tank.

If it is desired to mix at one time sufficient materials for the whole contents of a dipping tank of, say, 3,200 gallons capacity, the following method may be adopted:—

Place the total quantity of soft soap—24 lbs.—into the 400-gallon mixing tank, and add about 200 gallons of cold water. This mixture should remain—with occasional stirrings—until next day, when the soap will be found to have completely dissolved.

The paraffin (8 gallons) may then be added, and the whole beaten into an emulsion.

The 7-day dip is prepared in a similar manner with proportionate quantities.

Chindamora Dip.

Chindamora Dip.

Although it will probably be found to be most convenient to dissolve the arsenite of soda in a few gallons of hot water, this may be carried out in a short time with cold water in the following manner:—

Place two or three pounds in a bucketful of water and stir vigorously for five or ten minutes; allow any undissolved particles to settle, and pour off the liquid into the tank containing the emulsion; then add more arsenite to that remaining in the bucket and fill up with water again, repeating this till all the arsenite has become dissolved.

It is imperative that all the arsenite should be dissolved before being added to the dipping tank.

Solutions prepared as above directed can be added to tanks now containing Cooper's Dip.

The arsenite of soda is sometimes used without the paraffin and soft soap, but the increase of efficiency resulting from the addition of these ingredients has been clearly demonstrated by Col. Watkins Pitchford. Stock owners are therefore recommended to make the proper Natal Laboratory Dip.

A Native-owned Dipping Tank.—Our illustrations shew a dipping tank in the Chindamora Reserve which has been erected for the use of natives, and is being paid for by them. The natives using this tank own a large number of cattle, for about 1,700 head are dipped every week. The photographs reproduced were taken on the occasion of a visit by Mr. Williams, the District Veterinary Surgeon. The women shewn are engaged in filling the tank, which has a capacity of 2,800 gallons, with water that they had to carry on their heads in small calabashes a distance of 100 yards. This was finished by noon, and 160 head of stock passed through the tank that afternoon. As the cattle were wild and unaccustomed to being dipped, the work was expedited by the use of an electric prodder applied to any beast that might hesitate or refuse the plunge. The importance of teaching our natives the advantages of cattle dipping cannot be over-estimated, and farmers should do all they can to encourage them.

Slaughter Cattle to the Rand.—It is with great satisfaction we record that, since our last issue, arrangements have been completed by which cattle for immediate slaughter may be sent from Matabeleland to Johannesburg, under conditions which have already been made public in the Press. This applies only to Matabeleland, and persons wishing to avail themselves of these facilities may obtain full particulars from the Assistant Chief Veterinary Surgeon, Bulawayo. Consignments that have already been sent down were well received in Johannesburg, and it is hoped that, as this new channel for export is more exploited, it will be possible to expedite and improve the railway service.

The Spring Grange Herd.—In February we published photographs of pedigree Shorthorns imported by Mr. George Fath, of Plumtree. We are now able to shew our readers pictures of some pedigree Herefords, the property of Mr. George Mitchell, M.L.C., of Bulawayo, together with a bunch of grade heifers, the progeny of the pedigree bulls. This stock is now on Grange Spring farm, in Matabeleland, and the homestead in course of erection there is also shewn. The latter is being constructed of red sandstone, local lime and cement, with a thatched roof. The pedigree heifers were imported from England by Mr. Mitchell last year, being then from ten to eleven months old. They have now been in the country nearly a year, and only one of the lot was lost in the process of acclimatisation. In the group shewing the bull "Grasham" and some of his stock, the bull himself does not come out prominently, but on the front outside cover may be seen two other pedigree Hereford bulls of the same herd. The statistical returns for stock for last year, which appear in this issue, prove that the number of pedigree cattle in Rhodesia is steadily increasing. Mr. Mitchell has another bull and twelve heifers now coming out from Home. We believe that illustrations of this class of animal will be of great interest to our readers.

Stud Stock on the Government Farm, Gwebi.—A notice appears in our advertising columns with reference to the

Pedigree Hereford Bull "Grasham," with progeny, Spring Grange Farm.

Grade Hereford Heifers and Calves, Spring Grange Farm.

offer for sale by the Government of Friesland bulls, and ram lambs, bred on the Gwebi Experiment Farm, near Salisbury. It will be remembered that some three years ago the Government purchased a number of Friesland cows and a bull at the dispersion sale of Messrs. Maclaurin Bros., of Pomona farm, Salisbury. These cows, most of which were bred in the Queenstown district of Cape Colony, or by Messrs. Maclaurin, have been running on the Gwebi farm since the time of their purchase. The cows are all a really good type of Friesland, many being eligible for the "Appendix" Herd Book of the breed. The bull, Dutchland Colantha Sir Cornucopia, was imported from the United States. He comes of a family of very noted milking powers. The record average production over seven days of his dam and grand-dam was 30 to 40 lbs. of butter. The daily milk records of the dams for at least two milking seasons may be inspected. The bulls offered for sale have done well since birth, and are well grown, but have been accustomed to running on the veld in the day, being stalled only at night. They are all quiet and used to handling. They should prove valuable bulls for use with good-grade cattle.

The Merino rams offered are bred from ewes of robust, woolled, smooth-bodied, Tasmanian type by rams purchased from the flocks of Mr. Lennox McKay and Mr. Dan Hockly, noted flockmasters in the Eastern Province of the Cape.

Potato Growing.—Farmers who raise crops of potatoes for disposal early in the year are often disappointed to find there is practically no market for them in the towns, and in many cases doubtless think they are hardly used when the merchants offer them ruinously low prices. It should be pointed out that at that time, especially in January and February, potatoes are a drug on the market, because the local gardeners are then bringing their supplies into town. They not only sell in small quantities for one penny per pound, but also make house-to-house delivery at that price. Growers should so arrange that they are not compelled to be offering this crop at the beginning of the year. Plantings late in the rainy season, timed to mature in winter, will pay better. In red

soil these may be left in the ground far into the dry season and lifted only as required. Of course, the most profitable period for marketing potatoes is in the early season—November and December. With this object in view, the crop should be planted under irrigation at the earliest possible moment in winter. That time varies in different districts according to the incidence of frost, but it should be not more than a fortnight before the last frost is expected, because potatoes take three weeks to appear above ground.

We take this opportunity to warn farmers to keep their own seed potatoes this season, for we are informed that merchants' importations will be extremely small, and must not be relied upon.

Oil Factory.—We have been asked to publish the following circular for general information, and we are authorised to state that, although not explicitly set forth in the circular, it is the intention of the management of the factory that as many farmers as possible shall participate in the supply of the required 7,000 bags of nuts, representing the milling capacity of the factory. Therefore, tenders will be entertained for any portion of the gross quantity, whether from individual farmers, from farmers' associations or from co-operative societies.

Bulawayo,
28th January, 1916.

In July last letters were despatched to the farmers' associations throughout Southern Rhodesia, asking them to advise the Company at an early date what quantity of ground nuts it was estimated would be offered to the oil factory by their members during the current season, provided the Company maintained the price of 7s. 2d. per bag.

In response to this enquiry only one estimate was received, and in view of the uncertainty as to the quantity of ground nuts which would be offered to the oil factory, the Company has decided to call for tenders for the supply of 7,000 bags of 80 lbs. net (unshelled), which quantity represents the capacity of the existing plant.

Tenders are therefore invited from farmers for the supply of this quantity of ground nuts, delivered at the factory, Salisbury.

Tenders should state the variety of ground nuts offered, and should reach the Manager, the British South Africa Company's Oil Factory, Salisbury, accompanied by a fair average sample, not later than the 31st May, 1916. The ground nuts may be delivered at any time up to the end of September, 1916.

The oil factory is also prepared to purchase the following oil seeds, of clean first grade quality, at the undermentioned prices, delivered at the factory :—

Castor beans	1d. per lb.
Sunflower seed	¾d. per lb.
Linseed	2d. per lb.

The management reserve the right to reject any consignments of the above products which in their opinion are not of good quality, and, therefore, unsuitable for treatment at the factory.

I may add that experimental shipments of ground nuts and other oil-bearing seeds are being made to England, and the results of these shipments will be announced as soon as possible.

W. OLIVE,
Acting Commercial Representative.

Sleeping Sickness.—Special attention is drawn to a notice issuing from the office of the Medical Director which appears in the Game Law Summary at the end of this *Journal*. We print it a second time here, because it is urgently important that it should not be overlooked by farmers or others who may contemplate travelling for shooting or other purposes in the district referred to. It reads as follows :—

Trypanosomiasis.—Persons in search of game in the southern part of the Sebungwe district are warned of the danger of hunting anywhere west of the Sengwe and Lutope Rivers within the fly area, and especially of proceeding anywhere within the valley of the Busi River.

AGRICULTURAL SHOWS.—Our latest advices as to the dates on which the agricultural shows for 1916 will be held are as follows :—

Bulawayo, 31st May and 1st June.
Gwelo, 7th and 8th June.
Victoria, 16th June.
Umtali, 13th and 14th July.
Mazoe, 19th July.
Salisbury, 27th and 28th July.

ADVERTISEMENTS.—A comparison between the current number of this *Journal* and those of a year ago will reveal the fact that the advertisements have much decreased. This loss is due solely to conditions consequent upon the war, and not to any failure in quality or interest in the *Journal* itself, for we are constantly receiving evidence that the *Rhodesia Agricultural Journal* is more and more appreciated by the farmers and other subscribers. Decrease of advertisements means reduction of revenue, the effect being to throw an additional financial burden on the Government in producing the *Journal* at a heavier loss than usual.

In these circumstances we venture to point out that the *Journal* is an excellent advertising medium for all those whose business lies in any measure with the farming community, and they are many, including the following :—Dealers in farm implements, engines, etc.; veterinary supplies and instruments; fertilisers, seeds, groceries and clothing for farmers; building material; and produce. If all the Rhodesian firms whose business is largely dependent on the farming industry would spend a few pounds a year in advertising in these pages, the *Journal* would be placed on a sounder footing. Possibly farmers who value their *Journal* would help by bringing this matter to the notice of merchants in their districts, while the now very large number of men who run both town businesses and country estates would be serving their double interests if they advertised in the *Journal*.

CORRECTION.—Attention is called to an error which was, unfortunately, overlooked in the *Journal* for December, 1915. It occurs in Mr. Bevan's article, entitled "Ticks and Animal Diseases," on page 780. In the prescription for the three-day dip, "Paraffin, 1 lb." should read "Paraffin, 1 gallon."

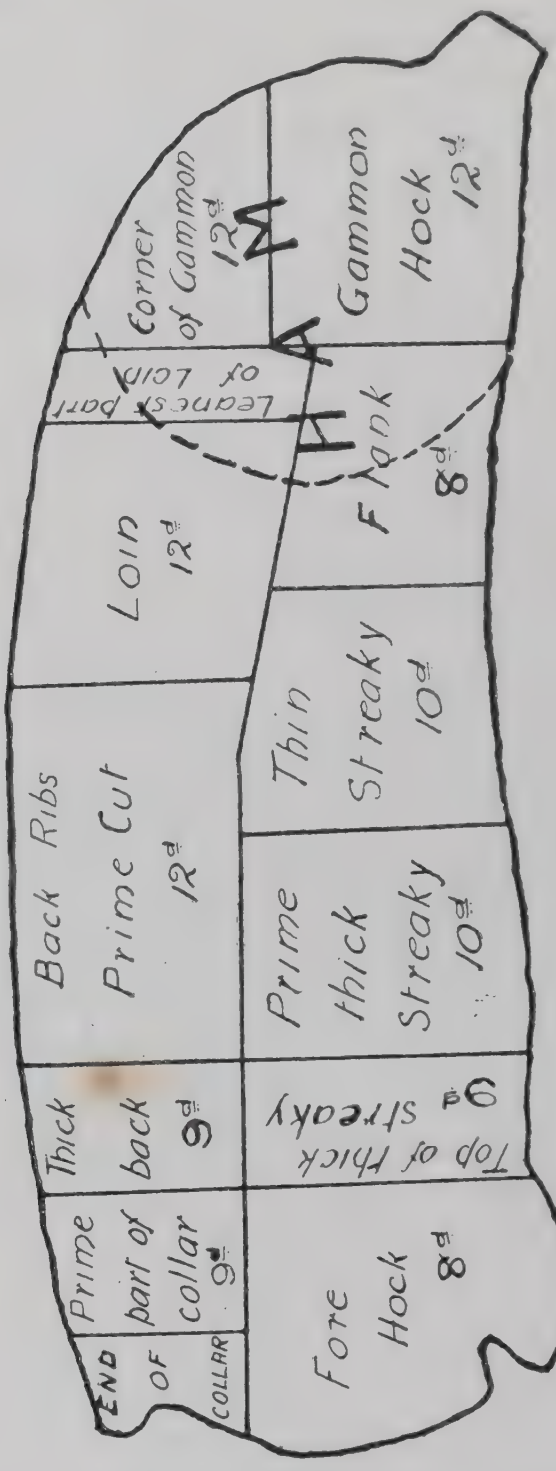
The Breeding and Feeding of Pigs for Bacon Factory Purposes.

[Revised.]

By R. C. Simmons.

A Side of Bacon.—The ultimate aim of the pig-feeder, so far as this article is concerned, may be considered to be the production of a side of bacon. The accompanying diagram, taken from the "Douglas Encyclopædia," illustrates exactly what a side of bacon is. The names of the various cuts are those in general use. For the purpose of shewing the relative value of the parts, the price of the gammon, or most valuable part, has been taken as being 1s. per lb., and the various other parts have been priced accordingly. A brief study of the diagram will make it clear to the breeder that some parts —as, for instance, the ribs, loin, gammon or ham, the thick streaky and thin streaky—are more valuable and saleable than others, such as those parts lying about and in front of the shoulder. It is obvious, therefore, that in the selection of breeding pigs one should choose those tending towards weight and development in the more valuable parts, and fineness in the cheaper and less desirable parts.

A Bacon Pig.—A bacon pig ready for the market should possess a long, deep body, with a straight or slightly arching top and straight underline. The shoulders should be fairly upright, joined closely to the body, and nicely rounded over the top. The body should not be any thicker through the shoulder at any point more than half-way up from the underline to the top line than through points at a similar height situated between the shoulders and the ham. The croup should slope but slightly from the loin to the root of the tail,



A Side of Bacon, shewing relative value of various cuts (*after Douglas*).

and should be a good length and maintain its width throughout, which width should be the same as that of the body and shoulders. In short, a straight edge laid against the side from the shoulder point to near the tail should touch at every point. The ribs should spring out well from the spinal column, but

A Pig Wallow.

Young Berkshire Sows

should fall in fairly vertical lines once their greatest curvature is attained, thus making a deep-bodied, rather than a round-bodied, animal, and the flesh of the belly should be thick and firm, in order that the underline may be approximately straight. The body should be carried on good, stout, clean straight-boned legs, free from weakness at the pasterns, and with square set hocks. The feet should be strong and compact, the animal standing straight up on its toes. The neck should be of medium thickness, with no tendency to coarseness, and the head should be clean cut and free from flabbiness at the jowl. The hair should be fine, the skin fine and not too thick, the body free from roughness and wrinkles, and there should be a general appearance of thriftiness and well-being.

The Size of Pig required by the Factory.—The average live weight of pigs sent to the factory should be from 180 lbs. to 200 lbs. Larger pigs than this are not required. It should be remembered that the most readily saleable are those having a good, even, firm covering of flesh, with a large proportion of lean meat, thick and firm in the belly parts. Very fat, lardy pigs, especially those with excess of fat on the back and on the inside of the belly, can only be used for second-class produce. A well-fed pig will, as a rule, dress out 25 per cent. less than his live weight. He will probably lose 5 per cent. of his live weight as the result of a long journey by train or wagon to the factory. That is to say, if he weighs 200 lbs. on the farm, he will weigh not more than 190 lbs. at the factory. Sows that have raised litters, old sows, boars, old castrated boars or "stags" can only be classed as third-class produce. The primest bacon is produced from young sows or barrow pigs from seven months to ten months old or thereabouts.

Breeds of Pigs Suitable for Bacon.—To manufacture a first-class side of bacon from an ill-formed or badly-bred or badly-fed pig is an impossibility. Every care, therefore, should be taken to select breeding animals which conform to the requisite shape and appearance, and are known by reason of their breeding to possess the attributes of thriftiness, early maturity and quality of flesh. Most British breeds fulfil the requirements of the factory in a greater or less degree. The chief of them are as follows :—

Berkshires.—Black pigs, with a white blaze on the face, white feet and a white brush to the tail, medium size, head broad and fleshy, well dished face, thin pricked ears rather inclined forward, jowl full and well into the neck, chest wide and deep, back long and straight and rather inclined to arch, ribs well sprung, belly full and thick, hams broad and deep and fleshed down to the hocks, legs short and straight, with good bone and well set apart, action smart and active. A good thrifty, very early-maturing pig; not quite so prolific in this country as some other breeds. Particularly well suited to the dairy farm, with a view to keeping in comparatively small areas, and feeding fairly highly from birth. Crosses well with either Large White, Tamworth or Large Black, and especially with the latter.

Large Yorkshires.—White pigs, of good size; in shape very nearly ideal bacon pigs. The face is long, light and wide between the ears, not so dished as in the Berkshires; ears large, fringed with soft hair and inclined slightly forward. They carry a large proportion of lean meat. The sows are docile, good milkers and very prolific. The boars are very impressive, and when bred to sows of other breeds, or to cross-bred sows, usually stamp their characteristics on the progeny in a marked degree. The breed is robust and healthy, but on account of their white skins and consequent liability to sunburn and other skin diseases, they are not quite so well suited to this country as black breeds. They cross well with the Berkshire and Large Black.

Middle Yorkshires.—White pigs, really the result of crossing the Large and Small Yorkshires. They resemble the Berkshire rather in type. The head is short and light, and the face dished, ears thin and pricked with a fringe of fine hair, hair long and plentiful. Noted for docility, early maturity and lightness of bone, but inclined rather more to fat than the Large Yorkshire. In view of the refinement in the Large Yorkshire which has taken place in recent years, the difference between the two types is not nearly so marked as formerly.

Small Yorkshires.—These are not suited for bacon, being too much inclined to excessive fat production.

Tamworths.—In colour a golden red hair, which becomes much darker and acquires a greenish-brown tinge with age, on a flesh-coloured skin; head fairly long and lean, snout moder-

ately long and quite straight, face slightly dished, ears wide with fine fringe, carried rigid, but inclined slightly forward, jowl small and light, neck long and muscular, bacon parts (in the more modern and refined specimens) well developed, but in many cases the rib is light and flat, the flesh hard, the temper indifferent, and they are slow in maturing. If used at all, should be crossed with early-maturing pigs inclined to fat production.

Large Blacks.—An entirely black breed, with a fairly long snout, and large drooping ears set well forward over the eyes, the jowl moderately heavy, the neck long, thin and muscular, shoulders oblique and fine, bacon parts well developed, with the exception of the hams, which slope too much, skin fine and soft, hair straight and silky. The breed can be grown to a considerable size, but the quality of the meat is excellent, the fat being especially fine and free from blubbery texture. Excellent grazers, the sows are docile, prolific and good mothers. Somewhat late in maturing. The black colour renders the breed especially suitable to exposure to strong sunlight. In European countries they do not withstand wet and cold well, but appear to be admirably adapted to the climate of Rhodesia. They cross well with the Berkshire and other early-maturing breeds.

The above list does not by any means exhaust the available pure breeds, many of which, particularly the American breeds, are good bacon pigs; but it is thought that for the present one or other of the breeds mentioned will meet Rhodesian requirements.

Cross Breeds and Grades.—A cross-bred pig is the progeny of a pure-bred boar and a pure-bred sow of different breeds. A grade pig is the progeny of a pure-bred boar and a cross-bred or mongrel sow.

It has been found that in the endeavour to develop the various qualities of most pure-bred pigs, some qualities have been developed at the expense of others. Close breeding, in order to obtain fixity of type, has somewhat impaired the fecundity of the Berkshire; again, breeding for early maturity has a tendency to induce the production of fat rather than lean, and so on. The result of this is that most factories prefer cross-bred pigs, and there is little doubt that a cross-bred or

grade pig is usually hardier, thriftier and fitter for bacon than the majority of pure-bred ones. In breeding for crosses or grades, no hard and fast rule can be laid down, except that whenever possible only a well-bred and pure-bred boar should be used. In most cases the best results will be obtained from pure-bred sows of known good breeding, but often the most satisfactory baconers may be produced from cross-bred or grade sows which are individually good and conform to the requisite type. The breeder, as in the case of cattle, should avoid crossing indiscriminately, and thus producing mongrels, but should endeavour so to control his crossings that, having acquired a satisfactory type, he may know how it was produced, and may, since he is dealing with known quantities, continue to manipulate them in the same manner.

Since the establishment of the B.S.A. Company's factory in Salisbury, the most satisfactory cross has been found to be the progeny of Large Black sows and Berkshire boars. The cross results in increased stamina, an increased proportion of lean meat as compared with the pure Berkshire, and earlier maturity than in the pure Large Black. Large Black sows being prolific and good mothers, larger and better litters than those from Berkshire sows may usually be expected. The progeny of Large White boars and Large Black sows have also proved to be very satisfactory. Here we have an advantage over the pure-bred Large White, in that, the sows being black, only the boars require extra protection from the sun. White predominates largely in the progeny, but under no circumstances would it be profitable to expose pigs intended for bacon to undue sun and heat. The Large White boar imparts constitution, stamina and a certain improvement in shape to the progeny, whilst the Large Black element tends towards refinement, and prevents them from becoming too thick in the back.

Other crosses which may often give satisfaction are as follows :—

Large White Boar and Berkshire Sow.—Here the result is much the same as the cross with the Large Black, except that the boar in this case tends to check over fat production. The Large White-Large Black cross may be preferable on account of the rather better maternal qualities of the Large Black sow.

Berkshire Boar and Tamworth Sow.—While this cross was at one time very popular in England, and is still so in some countries, the experience of the Salisbury factory management has been that it produces a hard flesh. This is probably due to the fact that there are few of the modern improved types of Tamworth in the country.

Notwithstanding the advantages of the various crosses suggested for factory purposes, the pure-bred pig is none the less valuable than formerly. Pure-bred boars are absolutely necessary, and in view of the small number of really good grade sows in the country, it is unlikely that the demand for pure-bred sows will tend to lessen.

Selection of the Boar.—A good pedigree is valuable, being a guarantee of ability to transmit the type. The boar should be the progeny of good parents, and preferably one of a large litter. It is also important that he should come from a herd of uniform quality. A good chance specimen from an otherwise moderate herd may not be very valuable as a stock-getter. Further important points are:—Length and depth of body, which should be wide, compact and firmly set on short straight legs, fine in the bone; strong muscular development, capacious chest and good heart girth, indicating constitution; shoulders wide but not coarse, well filled up and set back; sexual organs prominent and well formed; embryo teats full in number, distinct and evenly placed. The boar should be bright and active, but docile, free from coarseness, symmetrical, and should possess the characteristics of his breed. With advancing age the shoulders often become heavy, but this must not be confounded with coarseness.

Management of the Boar.—The boar should be well cared for from birth; he should never be allowed to fall off in condition; at the same time, he should never be over-fed, but hard, healthy and vigorous. He may run with other pigs till he is four months old, when he should be separated and kept in a yard or camp by himself. He may be used for service at eight months, but if it is possible to leave him for a further three months, so much the better. He should not run with the sows, but should have a separate pen well away from them, or separated by a solid wall. Sows should be brought to him when in heat, and allowed one service on the first day of heat, and be put to him again for one more service on the third

day. He may be allowed eight or ten sows in his first season, and thirty or forty in his second. He may serve two or three sows in one day if in good condition, and then be allowed two or three days' rest, or he may serve one each day for several days at a time. If many sows are put to him, he must be fed accordingly on good rich food, especially grain, and be kept in condition. A small daily allowance of monkey nut oil cake, in addition to mealies, or, if oil cake is not available, milk with mealies, will be found a profitable diet for a boar in hard work.

Selection of the Sow.—The sow, besides having the essential features of the bacon pig, should be, if pure-bred, of good pedigree and true to type, and in any case should be one of a large litter, from hardy, early-maturing, prolific parents. She should be docile, free from all coarseness, compact, broad and roomy in the quarters and loin, narrow at the top of the shoulder and light in the second thigh, deep and wide in the girth. She should have not less than twelve well-developed teats, evenly placed.

Management of the Sow.—The sow must be kept in good, healthful condition (but not fat) from first to last. She must never be allowed to become weak or poor, and should be carefully watched and fed more liberally should she shew signs of falling off. It is especially necessary that she should be kept in robust health when carrying or suckling young, otherwise early maturity and thriftiness in the progeny cannot be expected. A shady camp, with a lean-to shed in it, and with plenty of water and succulent non-heating food, will in most cases be the best for a brood sow, except immediately before farrowing, or when the young are small. A mud wallow, such as an old dagga pit, which can be filled with water and occasionally cleaned out, is a great acquisition in the sows' camp. A mud hole or wallow which has become foul or offensive is not a good thing, and should be cleaned out. The accompanying illustration shews a brick and cement-covered bath, which may be kept filled with about 10 inches of water and some mild, non-poisonous disinfectant, and is well worth the trouble and expense of building. The sow should not be less than nine or ten months of age when put to the boar. If put at too young an age, small immature litters are likely to result, and the growth of the sow is stunted. Sexual heat

lasts about three days, and, if the sow be in good condition, should recur every 21 days until the sow is stinted. If the sow fails to come in heat, stimulating food may induce the condition. When in heat, she should be put to the boar and allowed one service on the first day, and one more service on the third day. The gestation period is 112 days, or 16 weeks, varying a few days with some sows, more or less. A fortnight or so before farrowing, the sow should be separated from the herd, and brought into a comfortable sty, with a small exercise camp adjoining. She should be well fed at this time, with a view to milk production. A few monkey nuts or some milk, in addition to a small ration of mealie meal and good succulent food of some sort, will help considerably. Too great a proportion of fatty, heating food should be avoided. The sty should be bedded up with short dry litter. The sow will make her bed shortly before farrowing, and an eye should then be kept on her until the pigs are born. In the case of young sows with their first litter, it is sometimes necessary to remove each of the young as they are born, placing them in a basket or box with some clean litter until all are born. When it is seen that the last has arrived, and the sow is free from pain, the pigs may be put to her, and she will usually take to them kindly. Old sows as a rule do not require any attention. About half-an-hour after parturition, the afterbirth should come away, and should be removed and burnt. Should a sow become savage during parturition, and be difficult to handle, a good plan is to construct a small gate or hurdle the width of the sty, and to keep this between one's self and the sow whilst taking the pigs away, and so on. The sow may be left alone with her pigs for eight or ten hours; no food will be required until then, when a warm, sloppy, easily-digested meal may be given.

Management of Young Pigs.—For two or three weeks after birth the young pigs do not require any more exercise than may be obtained within a moderately roomy sty. The sow during this period may be let out for half-an-hour now and then, but no good will be gained by letting the little ones run too early. At the end of two or three weeks they may be allowed to run out round about and near the sty in the exercise camp, access to and from the sty being by means of a small opening not large enough to admit the sow. After

a few days of this, the sow may be allowed to roam at will during the cool part of the day in the exercise camp, taking the young pigs with her. They will thus be encouraged to forage and feed themselves, and, if the sow be not allowed to roam too far, healthful exercise will be obtained for the development of frame and constitution. Male pigs not intended for boars should be castrated at three weeks old. When feeding the sow, and when the pigs are about five weeks old, they should be encouraged to feed out of a small trough so situated that the sow cannot reach it. Milk will be the best food to commence with, and this should be supplemented with small quantities of mealie meal to make a wash. As the pigs get a little older, the addition of a little pea meal to the food will be beneficial, and a few pumpkins or roots may be given. All meal should be fed very sparingly to young pigs.

At the age of eight weeks or so the pigs will have practically weaned themselves, and may be taken from the sow. Should any of them appear to be weak or backward, they may be left a little longer, and only the strongest should be taken first. Having weaned the pigs, the object of the feeder is to maintain them in a healthful, growing condition for four or five months. It is not desirable to make them over fat; at the same time they must never be allowed to fall away. If early maturity is to result, the growth of the pig must be one uninterrupted progress. The question of analysis of food will be referred to later, but it may be noted here that in feeding young growing pigs one must remember that they require the material to build up bone, muscle and nerve tissue: they do not require large quantities of starchy matter, such as mealies. They require plenty of moisture, but one must avoid the not infrequent mistake of letting their food be too watery. They require a certain weight of solid matter per day, and if the food is too watery the stomach becomes distended with water while the body is insufficiently nourished, and the well-known "pot-bellied" condition results. When skim milk is available, it is an easy matter to supply suitable food. Milk mixed with mealie meal or potatoes as a morning and evening feed will usually form an ample supplement to the grazing obtained in the vleis or in the pig camp. When milk is not available, the matter becomes much more difficult, and a good supply of

green and succulent forage is essential. Lucerne, if available, is, of course, the best; but failing this, roots or green barley and monkey nuts, with a little pea meal, will probably form the best substitute. Exercise in moderation is necessary to the growing pig, but he should be subject to no discomfort such as heat or cold, want of good water or a suitable wallow, or great distances to travel for food. There is no reason whatever why young pigs up to four months intended for the factory should not be herded on clean ground in the vleis and so forth, but if there is not natural shelter for them in the heat of the day, they should be brought back into the sty by about 11 a.m., and be left undisturbed until the cool of the afternoon.

At the age of four or five months it will in most cases be profitable to confine the pigs more closely in sties, and to commence fattening in earnest, with a view to producing a well-matured carcase at about nine months of age if on a dairy farm, and at ten or eleven months if milk is not available. It must be constantly borne in mind that to produce a pig fit for the factory at nine or ten months the preparation of that pig commences with its dam before it is born, and that the slightest neglect, either to its dam or to the pig itself in the earlier stages of its separate existence, delays the time of its arrival at the factory, and increases the cost per lb. of flesh produced.

Pig Foods and Feeding.—An endeavour has been made in the foregoing remarks to emphasise the breeding of pigs of good quality. The term "quality" includes, amongst other things, thriftiness, early maturity, and a disposition to lay on flesh of a good texture. "Quality," then, is especially desirable where intensive feeding is contemplated, by reason of the much greater return given by such pigs for food received than by common or ill-bred animals. While it is comparatively easy to fatten pigs on a great variety of foods, including sound marketable produce and refuse of all sorts, a great deal of judgment must be exercised in the choice of foods and manner of feeding them, if a first-class quality of bacon is to be produced. The choice of foods again is often further complicated by the very necessary consideration of the cost of available foods or their value in the market, as compared to their return in the form of bacon to be realised by feeding them to pigs.

To one who wishes to become expert in the feeding of pigs or any kind of animal, nothing can take the place of daily practice and experience; at the same time a short study of the scientific side of the question of animal nutrition will be found to be extremely helpful. It will enable one to think and experiment more intelligently, and in most cases will materially add both to one's interest in the work and to the profits to be derived. Science with practice is of infinite value, but one must never forget that animals are not machines, that they have individual tastes, appetites and dispositions much like human beings. The expert and successful feeder is one who can endow every animal in his care with a personality, who can watch and understand its ways and habits, and who constantly provides not only for its bare supply of food, but for its varying whims and fancies. Those unaccustomed to cattle will smile at this statement, but the writer feels confident that it will be endorsed by any and every successful feeder of animals.

In the feeding of animals, what is known as the nutritive ratio of foods must be taken into account. The body of a pig contains from 35 to 60 per cent. of water, from 6 to 30 per cent. of fat, according to its condition, and from 2 to 5 per cent. of mineral ash. The flesh (muscle), skin, hair and internal organs are largely composed of nitrogenous matter. The heat, energy and driving power of the body are supplied by the carbohydrates and fat. All these ingredients are found in varying proportions in most farm foods. A suitable and profitable food is one in which the nitrogenous (or flesh-forming) substances and the carbohydrates and fat (or heat-producing) substances are in such a proportion and in such a condition that the animal may assimilate them in accordance with its needs without waste. This proportion of nitrogenous substance to carbohydrates and fat is what is meant by the term "nutritive ratio." When we read that the nutritive ratio of maize, for instance, is 1 : 8, we understand that maize contains one part of digestible flesh-forming substance to eight parts of digestible heat, fat and energy-forming material. In addition to the chemical composition of food, its suitability, digestibility, palatability and the proportion of moisture it contains must be taken into account, and, as before mentioned, its cost.

The following table (Wolff) illustrates more or less the class of food required by growing and fattening pigs of various ages :—

TABLE NO. 1.

Age of Pig.	Live Weight.	Total of Digestible Dry Matter required per diem.	Nutritive Ratio.
2-3 months	50 lbs.	2·1 lbs.	1 : 4
3-5 „	100 „	3·4 „	1 : 5
5-6 „	124 „	3·9 „	1 : 5·5
6-8 „	170 „	4·9 „	1 : 6
Over	Over	5·2 „	1 : 6·5

It will be seen that the proportion of nitrogenous matter required is greater in the young growing animal from two to five months old than in the more mature animal of eight months and over, which has presumably done growing to any great extent, and requires to put on weight only. Brood sows weighing about 200 lbs. require a ration containing about $4\frac{1}{2}$ lbs. of dry matter per diem, with a nutritive ration of 1 : 6.6.

Generally speaking, the proportion of water that a bacon pig requires in its food diminishes as the pig advances in age. The pig commences life, of course, on milk, which is largely composed of water, but at eight or ten months of age, just before being sent to the factory, it requires very little water indeed. This rule applies only to pigs that are protected from heat and fatigue, as should be the case with all properly managed pigs. A proportion of most foods consists of water. The following Table No. 2 gives the number of pounds of dry matter and nutrients contained in a given number of pounds of some of our more common foodstuffs. The amount of water may be arrived at by subtracting the amount of dry matter from the total weight. The figures represent average analyses, and are sufficiently correct for practical guidance.

TABLE NO. 2.

Note :—*"Pro." means proteids; "C.-H.," carbohydrates.*

Pounds of Food-stuff.	SKIM MILK. 1 : 2. Dry Matter.	Digestible. Pro.	C.-H.	Fat.	MAIZE. 1 : 9·6. Dry Matter.	Digestible. Pro.	C.-H.	Fat.
1	·094	·029	·052	·003	·89	·079	·67	·043
2	·188	·058	·104	·006	1·78	·158	1·33	·086
3	·282	·087	·156	·009	2·67	·237	2·01	·129
4	·376	·116	·208	·012	3 56	·316	2·67	·172
5	·470	·145	·260	·015	4·45	·395	3·33	·215
10	·940	·290	·520	·030	8·91	·790	6·67	·430
	BEANS. (Approximately correct for most varieties, including native.) 1 : 2·2.				CORN AND COB MEAL. (Maize.) 1 : 15.			
1	·89	·202	·42	·013	·85	·044	·60	·029
2	1·78	·404	·85	·026	1·70	·088	1·20	·058
3	2·67	·606	1·27	·039	2·55	·132	1·80	·087
4	3·56	·808	1·69	·052	3·40	·176	2·40	·116
5	4·45	1·010	2·11	·065	4·24	·220	3·00	·145
10	8·90	2·020	4·20	·130	8·49	·440	6·00	·290
	PEAS. 1 : 3·1.				BUCKWHEAT. 1 : 6.9.			
1	·895	·168	·518	·007	·874	·077	·492	·018
2	1·790	·336	1·036	·014	1·74	·154	·984	·036
3	2 685	·504	1·554	·021	2·62	·231	1·476	·054
4	3·580	·672	2·072	·028	3·49	·308	1·968	·072
5	4·475	·840	2·590	·035	4·37	·385	2·460	·090
10	8·950	1·680	5·180	·070	8·74	·770	4·920	·180
	GROUND NUTS. 1 : ·56.				LINSEED. 1 : 3·8.			
1	·893	·429	·228	·069	·908	·206	·171	·290
2	1·78	·858	·456	·138	1·816	·412	·342	·580
3	2·67	1·287	·684	·207	2·724	·618	·513	·870
4	3·57	1·716	·912	·276	3·632	·824	·684	1·160
5	4·50	2·145	1·140	·345	4·540	1·030	·855	1·450
10	8·93	4·290	2·280	·690	9·080	2·060	1·710	2·900

Pounds of Food-stuff.	PUMPKINS. 1 : 7·1. Dry Matter.	Digestible. Pro.	C.-H.	Fat.	POTATOES. 1 : 14·4. Dry Matter.	Digestible. Pro.	C.-H.	Fat.
1	·091	·001	·058	·003	·21	·011	·16	·001
2	·182	·002	·116	·006	·42	·022	·31	·002
3	·273	·003	·174	·009	·63	·033	·47	·003
4	·364	·004	·232	·012	·84	·044	·63	·004
5	·455	·005	·290	·015	1·04	·055	·78	·005
10	·910	·010	·580	·030	2·09	·110	1·57	·010
	GREEN MAIZE STALKS. 1 : 12·4.				GREEN FORAGE. (Approximately correct for Oats, Barley and Rye.) 1 : 8·7.			
1	·207	·010	·116	·004	·38	·024	·209	·0005
2	·414	·020	·232	·008	·76	·048	·418	·0010
3	·621	·030	·348	·012	1·14	·072	·627	·0015
4	·828	·040	·464	·016	1·52	·096	·836	·0020
5	1·035	·050	·580	·020	1·90	·120	1·045	·0025
10	2·070	·100	1·160	·040	3·80	·240	2·090	·0050
	MANGELS. 1 : 5·9.				MAIZE ENSILAGE. 1 : 12·5.			
1	·09	·010	·05	·002	·26	·012	·14	·007
2	·18	·020	·11	·004	·53	·025	·28	·014
3	·27	·030	·16	·006	·79	·037	·43	·021
4	·36	·040	·22	·008	1·06	·050	·57	·028
5	·45	·050	·27	·010	1·32	·062	·71	·035
10	·91	·100	·55	·020	2·64	·125	1·42	·070
	SWEET POTATOES. 1 : 28·8.				GOOD VELD GRAZING. (Approximate.) 1 : 5.			
1	·28	·01	·28	·004	·2	·023	·105	·005
2	·56	·02	·56	·008	·4	·046	·210	·010
3	·84	·03	·84	·012	·6	·069	·315	·015
4	1·12	·04	1·12	·016	·8	·092	·420	·020
5	1·40	·05	1·40	·020	1·0	·115	·525	·025
10	2·80	·10	2·80	·040	2·0	·230	1·050	·050

Table No. 3 gives the amount of dry matter and the total amounts of protein, carbohydrates and fat contained in a given number of pounds of some of our foodstuffs of which it has not been possible to determine the digestibility. They can, therefore, only be used as very rough guides, except in so far as the proportion of water and solid matter is concerned.

TABLE NO. 3.

	VELVET BEANS. (See Beans in Table No. 2.) 1 : 2·5				RAPOKO. 1 : 10·16.			
Pounds of Food-stuff.	Dry Matter.	Digestible and Indigestible.			Dry Matter.	Digestible and Indigestible.		
		Pro.	C.-H.	Fat.		Pro.	C.-H.	Fat.
1	·914	·273	·467	·058	·894	·076	·744	·013
2	1·82	·546	·934	·116	1·78	·152	1·48	·026
3	2·74	·819	1·401	·174	2·68	·228	2·23	·039
4	3·65	1·092	1·868	·232	3·57	·304	2·97	·052
5	4·57	1·365	2·335	·290	4·47	·380	3·72	·065
10	9·14	2·730	4·670	·580	8·94	·760	7·44	·130
	SUNFLOWER SEED. 1 : 4·3.				INYOUTI. 1 : 7·1.			
1	·915	·168	·096	·286	·906	·113	·713	·043
2	1·83	·336	·192	·572	1·812	·226	1·426	·086
3	2·74	·504	·288	·858	2·710	·339	2·139	·129
4	3·66	·672	·384	1·16	3·620	·452	2·852	·172
5	4·57	·840	·480	1·43	4·530	·565	3·565	·215
10	9·15	1·680	·960	2·86	9·060	1·130	7·130	·430
	MAJORDAS. 1 : 10·4.							
1	·053	·004	·041	·0003				
2	·106	·008	·082	·0006				
3	·159	·012	·123	·0009				
4	·212	·016	·164	·0012				
5	·265	·020	·205	·0015				
10	·530	·040	·410	·0030				

In order to obtain the nutritive ratio of a food, the percentage of digestible fat must be multiplied by 2.2 added to

the percentage of digestible carbohydrates, and the sum must then be divided by the digestible proteins. Thus the nutritive ratio of maize is arrived at as follows :—

$$.43 \times 2.2 + 6.67 \div .790 = 9.6$$

We now see that some foods, such as skim milk, pumpkins or potatoes, although highly nutritious, contain such a large proportion of water that if the animal were fed entirely on them, it would scarcely be able to contain sufficient bulk to obtain the requisite amount of solid substance, and would in consequence become "pot-bellied" and ill-nourished in appearance. Comparatively small quantities, then, of such foods must be used, supplemented with more solid food, such as maize.

Referring to Table No. 1, we find that for fattening a mature pig about 5 lbs. of solid food per day is required, and the nutritive ratio should be 1 : 6.5. It is unlikely that pigs will be fattened on one kind of feed only, and, moreover, such a practice should be studiously avoided. How, then, is one to make up a mixed ration of the required nutritive ratio, and containing the right amount of solid food? Let us suppose that our available foods are skim milk, maize, potatoes, ground nuts, native beans and majordas. On reference to Table No. 1, we find that skim milk has a high percentage of protein, but that it is very watery. Maize is a carbohydrate, or starchy food, but solid. Potatoes are starchy, but rather watery; beans again are solid, and rich in protein. As a trial, therefore, we will take a ration consisting as follows, namely, skim milk, 5 lbs.; maize, 2 lbs.; potatoes, 3 lbs.; and native beans, 1 lb., and by means of the tables we are able to put them down as under :—

Food used, in lbs.		Solid Matter.	Pro.	C.-H.	Fat.	
Skim milk ...	5	.470	.145	.260	.015	
Maize	2	1.78	.158	1.33	.086	
Potatoes ...	3	.63	.033	.47	.003	
Beans	1	.89	.202	.42	.013	
Total feed		3.77	.538	2.480	.117	Nut. ratio, 5.08

As a ration for a mature pig, we find that first of all it contains insufficient solid matter, and, secondly, that its

nutritive ratio is too narrow, or, in other words, it contains insufficient carbohydrates or heat and energy-producing substance. It is an insufficient feed for a pig eight or nine months old; but, as it happens, it is almost exactly right, according to Table No. 1, for a pig about five months old, which, being in a growing stage, requires more flesh-producing material. For our mature pig we require more solid matter of a carbohydrate or starchy nature. Milk will not help us out of the difficulty—it is rich in protein, and is watery. Beans are rich in protein, potatoes are starchy but rather watery, so let us see if some additional maize will meet the case, because this is both solid and starchy. Putting the ration down again as above, with $3\frac{1}{2}$ lbs. of maize instead of 2 lbs., we find the result to be :—Total solids, 5.1; and the nutritive ratio, 5.9. The ration is now right for weight of solids, but is a little rich in protein. We need not, however, put ourselves to the trouble of another calculation, because we know that all that is required is possibly a few more potatoes. We have quite enough information to re-assure us that we are working on economical lines, and beyond this we shall be largely guided by the progress or otherwise made by the pig, and by its general appearance. Should we run short of skim milk, or possibly require it more urgently for younger pigs, we may profitably replace the watery part of it by the majordas, and make up protein by a judicious use of beans and possibly a few ground nuts.

The foregoing serves to shew how a knowledge of the nutritive ratio of foodstuffs may be used as a guide to the feeder. The writer would, however, emphasise the fact that a knowledge of the chemical analysis of foodstuffs without a knowledge of their action in practice may often be misleading, and the matter should always be regarded from both points of view. Mathematical exactitude in making up a ration is not necessary, but the ration should never be narrower than those recommended.

The following sample rations may be helpful to the reader :—

For heavy brood sows in pig :—

(1) On first quality grazing—Maize 2 lbs., and majordas as required.

(2) On moderate grazing—Maize 3 lbs., ground nuts ½ lb., and majordas as required; or

(3) Sweet potatoes 6 lbs., maize 1 lb., ground nuts 1 lb.; or

(4) When very little grazing of any kind is available—Skim milk 10 lbs., sweet potatoes 6 lbs., and maize 2 lbs.

(5) When no milk is available—Maize 3 lbs., beans 1 lb., and majordas, pumpkins or other cheap succulence as desired, or up to about 10 lbs. daily. For sows immediately before farrowing, or when suckling young, the above rations may be selected from, but special attention must be paid to the provision of good succulents, and the concentrated foods will probably need increasing all round if large litters are being suckled.

For young pigs from two and a half to four months old, running on fairly good pasture during a portion of the day :—

(1) Potatoes 2 lbs., ground nuts ¾ lb., maize ½ lb., pumpkins 5 lbs.

(2) Potatoes 4 lbs., skim milk 5 lbs., beans or peas ½ lb., maize ½ lb.

For pigs from four to six months old :—

(1) Potatoes 6 lbs., ground nuts 1 lb., maize 2 lbs., plus grazing or ample supply of pumpkins, etc.; or

(2) Skim milk 5 lbs., maize 2 lbs., potatoes 3 lbs., beans or peas 1 lb.; or

(3) Potatoes 6 lbs., skim milk 5 lbs., maize 2 lbs., beans or peas ½ lb.

For pigs six months old and upwards :—

(1) Potatoes 6 lbs., skim milk 5 lbs., maize 3 lbs., beans 1 lb.; or

(2) Potatoes 4 lbs., pumpkins 4 lbs., maize 3 lbs., beans or peas 1½ lbs.

(3) Skim milk 5 lbs., maize 3½ lbs., potatoes 5 lbs., and beans or peas 1 lb., or ground nuts ¼ lb.

(4) Inyouti 4 lbs., green maize 10 lbs., ground nuts ¼ lb.

Notwithstanding the fact that the pig will eat almost anything, he is, if allowed to be, a very clean feeder; and, although he has, or should have, a voracious appetite, he eats comparatively little at a time, especially when he is nearing fitness for the factory.

The following are important points to observe in giving feed to pigs :—

Never give more at one time than will be finished up at a meal.

Feed regularly at fixed times, and three times a day if pigs are confined to sties.

Clean drinking water should always be available, also a clean wallow for stud pigs.

All grain should be ground into meal, excepting small quantities which may occasionally be given whole for a change.

Meal should be soaked rather than boiled.

Potatoes and hard roots, such as mangolds, are better cooked than raw.

Pumpkins and majordas are best given raw.

A proportion of 3 lbs. of water or skim milk to 1 lb. of meal is the best for fattening pigs. More moisture may be used in the case of stores or brood sows when not with young.

Green foods should be given at midday, more concentrated foods at night and morning.

Mixed meals are more profitable than food consisting of one kind only. An occasional variety in the food is an advantage.

Flesh foods, such as the carcases of animals that may have died from accident or disease, and slaughter house refuse, should be avoided.

Wood cinders, charcoal or coal ashes and lime should always be available. A sod of earth thrown into the fattening sty every day is usually appreciated.

A little salt lick is beneficial, but brine in any quantity, such as is sometimes contained in dairy and hotel refuse, is fatal.

CROPS FOR PIG FEEDING AND THEIR USES.—*Maize.*—This crop is a great weight-producer, but the grain, if fed alone, will not produce a satisfactory bacon. If fed in conjunction with other foods having a high protein content, such as beans, peas, ground nuts, skim milk or green forage, it is a most suitable and valuable feed. Maize fed alone to successive generations of breeding pigs tends to produce loss of constitution and prolificness. The practice of grazing pigs on the standing maize crop has been condemned in Australia, on the ground that it tends to produce oily bacon.

Velvet Beans.—A heavy cropper, useful either for the grain or for green food, or for making into ensilage. If grazed, the pigs should be turned in about the time the beans are ripening. If used as a soiling crop, it should be cut before the beans form. The beans themselves, ground into meal and mixed with maize, form a well-balanced ration, especially for "topping up" pigs. They should be used sparingly with young pigs, as they are liable to be too heating.

Peas.—This is one of the best possible crops for pigs, and, fed in conjunction with maize, produces a really good bacon. Their use tends to prevent the loss of stamina and reproductive power, which is induced by an exclusive diet of maize. Peas should not be fed alone, especially to young pigs, as they cause unthriftiness, but should always be used in conjunction with some starchy food such as maize, sweet potatoes, or potatoes.

Buckwheat.—This is a good feed, fairly rich in protein. It should be fed in conjunction with maize, but sparingly, never more than one-third buckwheat to two-thirds maize, as it tends to induce constipation.

Rye.—This has about the same feeding value as buckwheat, and should be used sparingly for the same reason.

Native Grains.—No very reliable information is at present available with regard to the bacon-producing qualities of our native grains other than maize and kafir corn. Inyouti has been well spoken of, and is worth giving a good trial. It will probably give good results if combined with a small ration of a food rich in protein.

Kafir Corn.—This is not quite so rich a grain as maize, but may be used much in the same way. The young shoots of kafir corn are sometimes poisonous, but the more mature plant is quite harmless.

Potatoes.—These should be cooked, and, as they contain a good deal of starch, should always be used in conjunction with some food having a high protein content.

Sweet Potatoes.—This is an easily grown and profitable crop, and it forms a nourishing and succulent food at a time of year when succulent food is scarce. Sweet potatoes are particularly convenient for planting in small areas for pigs to harvest themselves. They are very poor in protein, and need to be fed in conjunction with some food rich in protein.

Mangels, Beet, Turnips and Swedes.—These are all excellent feeds, but in this country they are usually too expensive to be used in large quantities for feeding pigs. They are very valuable feeds for brood sows near farrowing or with young. They are all best cooked.

Pumpkins and Majordas.—A most valuable food for pigs, and one of the cheapest means of providing succulent food in winter. The seeds of pumpkins are very nutritious, and they tend to check the invasion of worms. These vegetables give the best results raw.

Lucerne.—This is excellent for pigs, as for all stock. It should be cut and fed from a small rack, for if thrown on the floor much is liable to be wasted. It is one of the best feeds for sows near farrowing, or with young, and for young pigs. It should in all cases be fed with maize, potatoes, or some other starchy food.

Green Forage (Barley, Rye, Oats, etc.).—All excellent green feeds, which, although not nearly so valuable, may be used in the same way as lucerne.

Paspalum dilatatum.—This is a suitable grass to sow in vlei ground for winter feed.

Beggar Weed.—A perennial legume which provides green food from spring to early autumn.

Good Pasture.—This is very necessary, not only for breed sows and young, but also (especially on maize farms) for using in conjunction with maize for fattening pigs. The soft, succulent couch grass, found as a rule in vleis, near river beds and streams, is the most suitable veld for pigs; its creeping stems are soft and juicy, and it is perennial and not easily eaten out.

Ensilage.—This may be used as a substitute for grass and green food in the winter months, but is not so valuable for pig feeding as for other purposes.

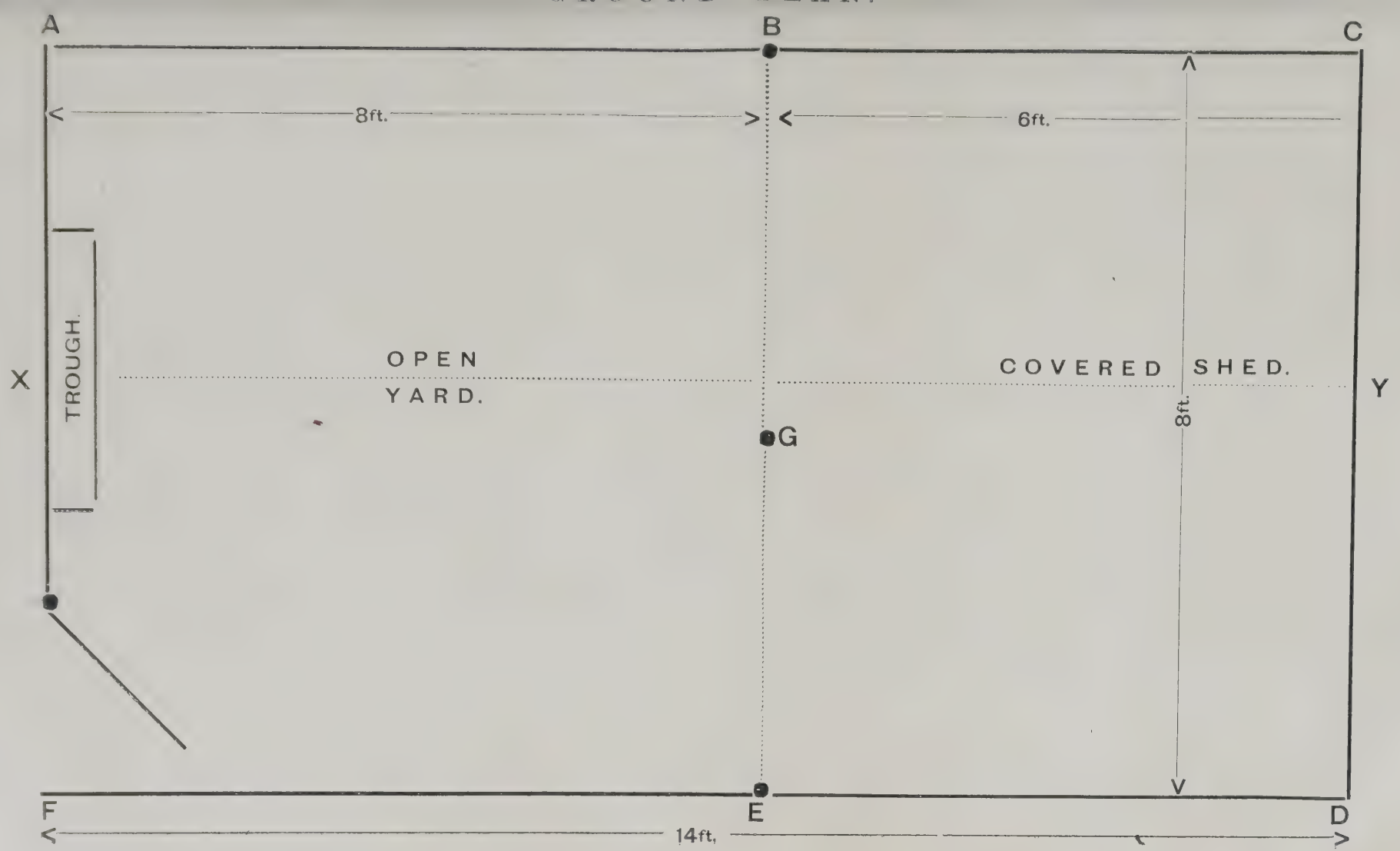
Dairy Produce.—*Skim Milk* is perhaps one of the most valuable feeds for pigs. It is rich in protein, and contains a large proportion of water, and should, therefore, be fed with dry and starchy foods, such as maize. It may be fed with advantage in conjunction with potatoes, but care must be taken not to make the ration too watery.

Butter Milk.—This is equal to skim milk when undiluted, but it usually contains much water. Care should be taken when feeding it to pigs to see that it does not contain the brine sometimes used in salting butter.

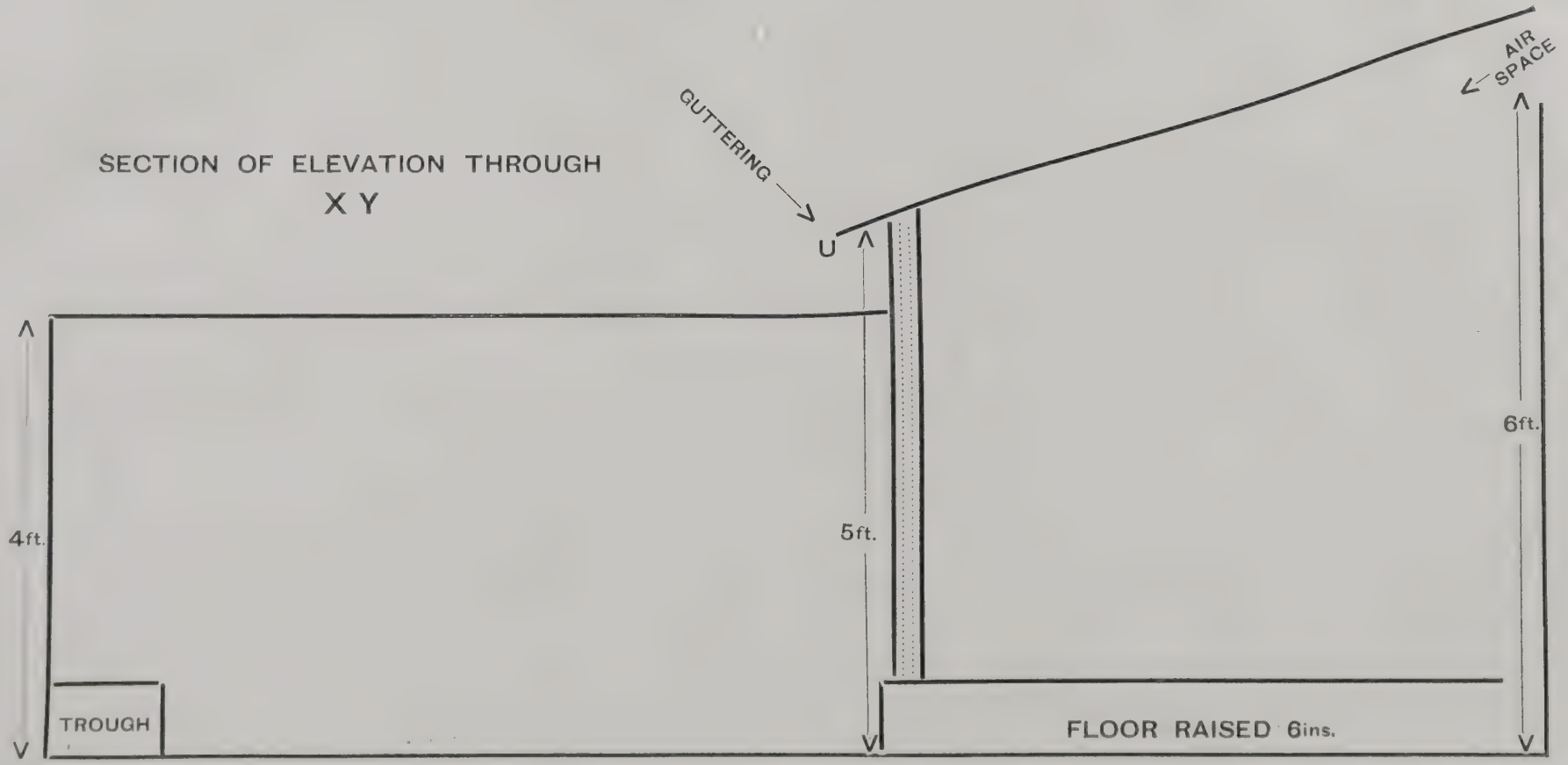
Whey.—This is not nearly so nourishing as skim milk, and should be used fresh in conjunction with foods of high protein content. When fed alone, it is liable to produce stiffness and lameness in the joints, preceded by scours.

Housing, etc.—Elaborate housing in this country is not only unnecessary, but is to some extent, apart from the question of cost, undesirable. Just as we find that heavily built and enclosed houses, such as are built in parts of Europe, are not suitable to this country, so we find that animals of all kinds are better if they are allowed as much fresh air as is compatible with reasonable shelter from sun, wind and rain. The essential requirements of a pigsty are as follows:—Light, air, dryness, freedom from cold draughts in winter, coolness in summer, and easily cleanable. Within wide limits any material recognised as suitable for building shedding may be used, but if vermin, such as tampans and fleas, are likely to be troublesome, material that will afford as little harbour for vermin as possible should be used. Generally speaking, a

brick and iron or brick and thatch building will give the most satisfaction, and has the advantage of being permanent, but if funds are not available for permanent buildings, wooden poles, corrugated iron, pole and dagga, or dry stone may serve a useful purpose for a time, and for open exercise yards, or internal divisions even, wire or wire netting may be used. If brick is used, it will add considerably to the satisfactory nature of the building if the walls are well pointed with lime mortar. The only really satisfactory permanent floor appears to be cement, with wooden sleeping boards for use in winter. Sleeping boards, by the way, should always be of a movable nature, and should be taken out periodically for airing and drying. Temporary floors are often made of large flagstones, but are more satisfactory if they are macadamised in the same way as a street. To macadamise a floor, the soil should be removed for a depth of a foot or so, and a layer of large stones laid in place. These are covered with smaller metal, and finally with shale or gravel, the whole being well rammed down. A good plan when building sties is to treat the whole of the area on which the sties will stand in this manner, and they can then be built on it without any further foundation. A simple and efficient plan of a sty to accommodate one brood sow and litter is represented by the following sketch :—


A
B
C
8ft.
6ft.
TROUGH.
X
OPEN
YARD.
COVERED SHED.
Y
8ft.
G
F
E
V
D
14ft.

SECTION OF ELEVATION THROUGH
X Y



The measurement over all inside is 8 ft. by 14 ft. B, C, D, E is covered by a lean-to roof, supported on poles at B, G and E, and quite open in front. A, B, E, F is an open exercise yard. The height of the fence of the yard is 4 ft., and the shed is 7 ft. high at the back and 5 ft. high in front. At the top of the back wall an air space of 1 ft. should be left. The floor of the covered part is raised 6 ins. above the rest, to ensure it being dry. In some situations it is difficult to choose a really dry site for pigs in a convenient spot. On granite soils, for instance, in wet weather springs are likely to make their appearance, and it is most difficult to ensure one's buildings being really dry unless they are most elaborately built. This trouble may be overcome in temporary sties by raising the bed of the covered part even as much as 2 ft., and making a sloping way up to it from the exercise yard. In this case the walls of the covered part must be correspondingly raised. The writer has seen this plan most successfully adopted for a fattening sty in a very wet granite situation, the sleeping part remaining perfectly dry and warm in extremely wet weather. It may be noted here that for fattening pigs it is not necessary to clean out the sty daily. So long as there is dry sleeping accommodation, it is more profitable merely to add litter every day and to let the dung accumulate.

The sty represented in the foregoing sketch may be adapted to one's requirements in various ways. For fattening sties, for instance, it may be made double in width to accommodate ten or twelve pigs. It may be arranged in rows either in a single line, or in two lines facing one another, with a feed passage between, or in a hollow square, according to the taste and ideas of the individual farmer. In any case, should the reader require further and more detailed information, it is always available on application to the Director of Agriculture at Salisbury.

Transport of Pigs.—Having dealt practically with the whole question of pig raising, there remains the question of the transport of pigs to market. Pigs intended for bacon must not be bruised or knocked about. A loading ramp on the farm, erected near and connecting with the sties, is well worth the very small amount of labour and material required to build it

Pigs should not be fed heavily before loading up, but if they are to travel long distances, water and light feed should be provided at intervals. They should be kept out of the sun and heat as much as possible. It is not a difficult matter to construct hurdles or rails for a light trolley or wagon, which are easily adjustable when it is desired to transport pigs, and this forms by far the best method of road transport. On hot days a bucksail or grass may be thrown over the rails to protect the pigs from the sun. Whatever the method of transport be, the object is to allow the animals to travel in as much comfort as possible. Over-driving, over-crowding and so on all mean so much off the value of the meat, and in hot weather may mean the death of the pig and total loss.

Bacon Factory.

Owing to the partial failure of the grain and other food crops this season in consequence of the drought, the Company has decided to increase temporarily the price paid at the bacon factory for first-class bacon pigs from 4½d. per lb. live weight to 5d. per lb. live weight.

This increase in price will take effect from the 1st April, and it must be understood that it is a temporary one to meet the special conditions now prevailing.

Rhodesian Citrus Pests.

(Continued.)

By Rupert W. Jack, F.E.S., Government Entomologist.

We have next to consider two minor pests of citrus trees, both of which are generally distributed throughout South Africa.

The Black Orange Aphis (*Aphis tavaresi*).—This insect, which is frequently referred to as "Black Fly," or simply as "blight," is shewn on Plate IV., and is too well known in South Africa to need description. It attacks the young shoots of citrus trees, and being very prolific, frequently covers them almost completely. Like the Brown Scale, it produces a great quantity of honeydew on which the Sooty Mould invariably grows, and by its presence renders infested trees very conspicuous and unsightly. Like the scale insects, to which they are related, the aphides or plant lice feed by sucking the juices from the tissues of plants. In consequence of the loss of sap due to severe infestation, the young shoots of the trees are checked in their growth. Young trees may be severely injured, but the pest is rarely serious on older trees. Infestation is generally most severe in the spring months before the rains, but the insects may be found throughout the year.

Habits.—The breeding habits of plant lice are unique and interesting, and whilst a detailed account would be out of place in a paper of this nature, the main points are worthy of consideration by farmers and fruit-growers as affording an insight into the extraordinary powers of increase of these little pests, and the need for thoroughness in applying remedies. Throughout the warm months of the year reproduction is mainly parthenogenetic, that is to say, the females produce young without the intervention of the male. Two forms of the females occur, namely, winged and wingless. The wingless

females, of course, can only add to the infestation of the plants on which they are situated, it being the province of the winged examples to seek other plants. The young produced in this way are themselves capable of parthenogenetic reproduction within a few days, and this early maturity of the offspring, rather than the number of young produced by each individual, is responsible for the tremendous pace at which these insects increase. At certain seasons sexual forms are produced, and after pairing, the females lay a few eggs, which, in temperate climates at least, usually carry the insect over the winter, hatching out in the spring. The foregoing remarks are generalisations applying to plant lice generally, and not to the Black Orange Aphis in particular. To what extent a sexual generation may be necessary to the life economy of this insect in a climate like that of Southern Rhodesia is a question which only a close study of the insect could settle. As already stated, the living insects are to be found at all seasons of the year.

Natural Enemies.—Several species of ladybirds feed freely on this aphis, of which *Chilomenes lunata* (Plate VI., Figs. 11 and 12) is perhaps the commonest. The maggots of certain species of "Hover-flies" (*Syrphidæ*) are also exceedingly useful enemies. These maggots are commonly green in colour, attaining a length of about three-tenths of an inch. They maintain their hold on the leaf by the under surface of the body towards the blunt (posterior) end, and have a characteristic habit of tapping around with the head end until an aphid is found. The aphid is seized, wrenched from its hold and lifted high in the air, whilst the powerful sucking apparatus of the maggot extracts its juices. This operation is generally a matter of from 20 to 30 seconds; the empty skin is discarded and the tapping re-commences, leading quickly to the seizure of another aphid. The writer once timed a hungry Syrphus maggot, and found that it dealt with ten specimens of the cowpea aphis in about six minutes. The adult flies of our commoner species measure about two-fifths of an inch in length, and are conspicuously banded with yellow. Their most pronounced characteristic, however, is the habit of hovering motionless in the air except for their rapidly vibrating wings. They may frequently be seen hovering close to aphis-infested foliage.

Plant lice have another enemy in the young of certain insects known as "Lacewing Flies," which are commonly called "Aphis Lions." These are active little insects with prominent jaws, not unlike ladybird larvæ. Some of our species cover themselves with the skins of the aphides they have emptied of their contents. The adult insects are exceedingly delicate and fragile. They possess four membraneous wings after the pattern of those of dragon flies, and their eyes are commonly metallic gold in colour. Apart from external enemies, great numbers of plant lice are apt to be parasitised by minute "wasps," which lay their eggs in the body of the aphides, on the tissues of which the tiny grubs feed, bringing about the death of their hosts. On the whole, however, it is probable that climatic conditions form the most effective of all checks on these insects. Heavy rain is fatal to enormous numbers, and aphides generally do not increase to any extent whilst heavy showers are frequent. Sudden cold and great heat are also fatal to vast quantities of these delicate insects.

Remedies.—Plant lice are amongst the easiest insects to kill with contact insecticides, but, owing to the high rate of reproduction, great thoroughness in the application of remedies is essential. A few females missed by the spray are capable of re-infesting the trees in a very short space of time. The grower has the choice of a variety of substances for use against the aphis, including dilute paraffin emulsion, resin wash, soap wash, tobacco wash, tobacco and soap wash, etc. The concentrated paraffin emulsion prepared as already described may be diluted with twelve times its bulk of water for aphis destruction, instead of nine as used against scale insects. Resin wash may be used at two-thirds the normal strength, and soap wash may be prepared with one pound of soap to each three gallons of water. Preparations of nicotine or infusions of tobacco are second to none for destroying aphides. Many proprietary nicotine and tobacco extracts are on the South African market, and the better brands, containing as they do a fairly constant percentage of nicotine, are more reliable in their results than home-made preparations. An effective tobacco wash may, however, be made by filling a barrel or drum with dark refuse tobacco, covering the tobacco with water and allowing the whole to stand for several days before draining off the

liquid, which may be diluted for use to the colour of strong tea. Tobacco should not be boiled in water to form the wash, as the active nicotine is volatile, and some of it is likely to be lost in the boiling. An addition of one pound of soap to each ten gallons of tobacco infusion increases its wetting power and efficacy.

Citrus Psylla (*Trioza sp.*).—The *Psyllidæ* or jumping plant lice constitute a family of insects allied to the aphides and the scale insects. The present species occurs throughout South Africa, and is found in widely separated localities in Southern Rhodesia, although it is not a very common pest nor a very destructive one. It attacks practically all varieties of citrus trees, confining itself to the young foliage, which becomes wrinkled in a characteristic manner (see Plate V.). Young trees suffer most, being rendered very unsightly by the distortion of the leaves, the natural functions of which are also interfered with to a certain extent, resulting in a check to the growth of the shoots. The presence of this pest on nursery stock is particularly undesirable, as, apart from any damage done, infested trees are practically unsaleable.

Habits.—Lounsbury gives the following account of the breeding habits of this insect:—"The eggs are generally deposited along the edges of expanding leaves. These eggs are yellow in colour, oval in form and have a short stem-like projection at one end. The young larvæ crawl on to the under surface of the leaf and settle, and it appears that, wherever one settles and begins to draw nourishment from the leaf, a pit-like depression slowly forms. The young insects fit nicely into these depressions, and are not especially conspicuous. They are pale yellow, and bear a superficial resemblance to the young of the Brown Scale, but can at once be distinguished by the presence of a short and delicate fringe about the body. This fringe is composed of a great number of straight, white, waxen filaments of equal length. The eyes are reddish and quite large; they are easily seen through a low power magnifying glass, as also are two slightly larger, widely separated, brownish spots on the abdomen. During this stage the insects are capable of moving about, but apparently do not often choose to do so. Finally, these scale-like bodies develop into winged insects."

Natural Enemies.—The writer has no experience of any natural enemies of this pest in Rhodesia, but on infested foliage recently received from Umtali, over 90 per cent. of the insects shewed the emergence hole of an internal parasite. Lounsbury records a species of Syrphus fly as an enemy in Cape Colony.

Remedies.—By picking off and destroying the infested leaves regularly the pest can be kept in check, and this is generally practicable in view of the fact that remedial measures need only be applied to young trees. If larger trees should under exceptional circumstances suffer severely enough to call for treatment, very thorough spraying at intervals with one of the washes recommended against scale insects is likely to be beneficial.

Modes of Dissemination of Scale Insects, Aphides, etc. —In considering the methods by which scale insects and other pests, more or less stationary on their hosts, are spread, it is necessary to adopt two headings : (1) natural spread, from tree to tree; (2) artificial distribution, from district to district, state to state, continent to continent. With regard to natural spread, plant lice and psyllids, of course, infest new plants through the agency of the winged females, but all female scale insects are wingless, and these pest must therefore rely on external agencies for transportation to fresh food plants. Where plants are growing very close together, even touching one another, as in a nursery, the activity of the larvæ, or nymphs in the case of many naked scales, enables the species to spread slowly, but these forms are unable to cross the open ground to any distance. The most effective agency of spread is probably the wind. Birds and insects, including possibly the deliberate action of certain ants in the case of species which secrete honeydew, are minor agencies. Artificial distribution is brought about by the movement of infested plants or parts of plants by man himself. Through this agency many species of scales and plant lice, as well as other insects, have been given practically world-wide distribution, and it may be noted that the most destructive pests are generally those introduced from other climates, owing to the fact that the pest is generally introduced unaccompanied by the whole of the natural checks that prevented its undue

increase in its original home, whilst the climate of its new home may be more favourable to increase, especially when insects are introduced from a north temperate country to a warm temperate or sub-tropical zone. All the injurious scale insects dealt with in this paper are introductions. To guard against the introduction of those that do not occur in South Africa or Rhodesia is the object of the Government regulations restricting the importation of plants from oversea and from beyond our borders, whilst the Nurseries Ordinance aims at checking the dissemination of pests from these centres. Owing to the distances between orchards in this Territory, if all the trees planted are free from pest, they are likely to remain so for very many years to come, and the fruit-grower be saved considerable labour and expenditure in consequence. The utmost care should be exercised by the farmer not to introduce plants and trees to new farms from private gardens that are likely to be infested with any pest of fruit trees, *and there are very few gardens that are not.* The fact that citrus pests may be carried on other varieties of plants must not be overlooked. It is an unpleasant fact that the generosity of a town resident in making a present of plants and cuttings to beautify a farmer friend's garden may be the cause of considerable loss and trouble to the latter. The transportation of plants by public carriers can be controlled, but the choice as to whether he wishes to run the risk of introducing pests by means of his own conveyance lies with the farmer himself.

Ladybirds which feed on Scale Insects and Aphides.—The activities of ladybirds in devouring the scales and aphides which attack fruit trees are of great importance to the citrus grower generally, and of paramount importance in a country where the Australian Bug is present and capable of flourishing, as, but for the co-operation of these little allies, the profitable cultivation of citrus trees might well be rendered impossible. No other citrus pest is so well controlled by natural enemies as the Australian Bug, but there are a number of beneficial ladybirds which aid in checking the rate of increase of various scales and the black aphis, and an attempt is made to illustrate some of the commoner species on Plate VI.

The Vedalia Ladybird (*Norius cardinalis*).—This famous insect, which has already been alluded to under the heading

Plate IV.

Plate V

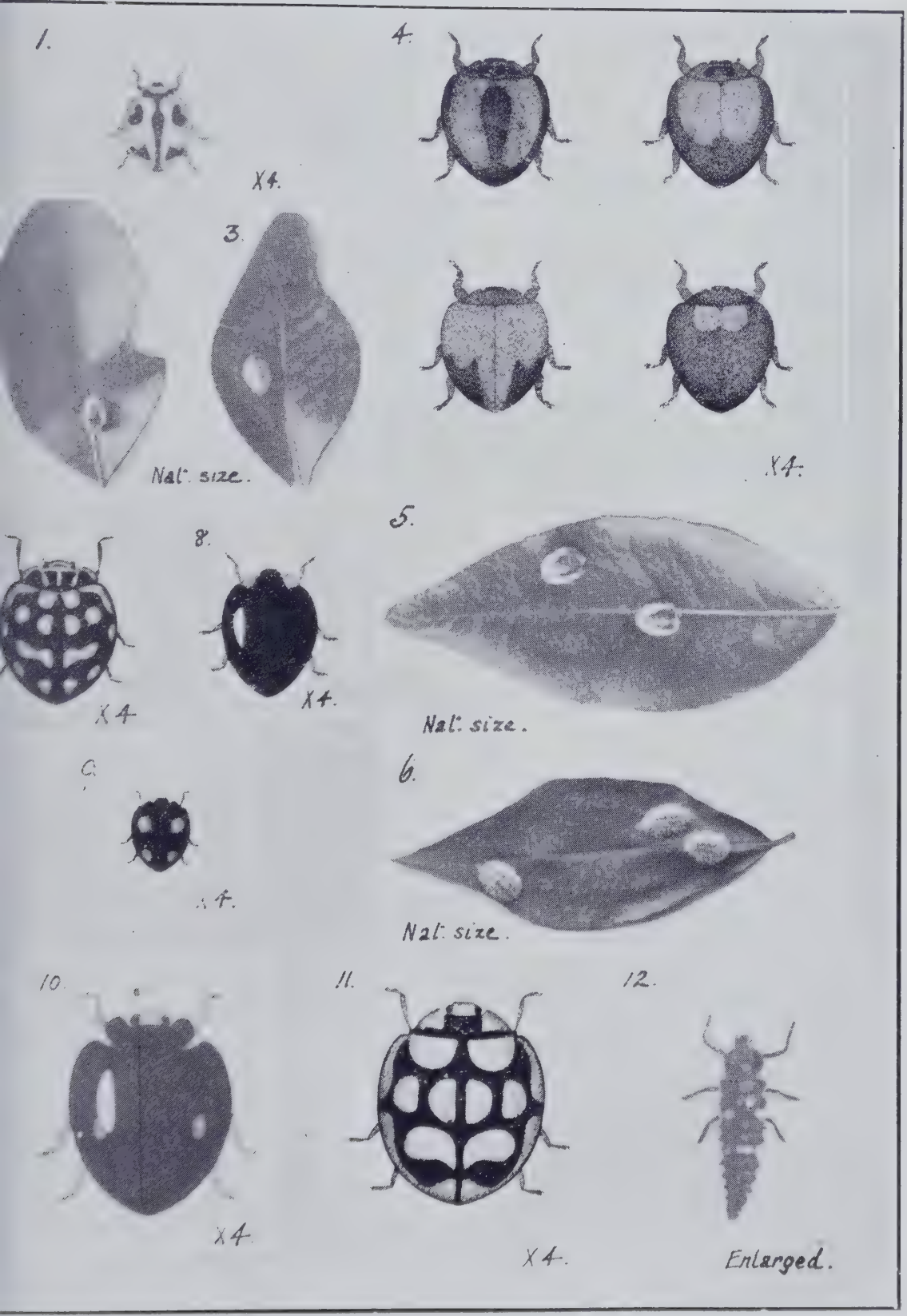

1.
X4.
4.
X4.
3.
Nat. size.
8.
X4.
X4.
5.
Nat. size.
6.
Nat. size.
7.
X4.
10.
X4.
11.
X4.
12.
Enlarged.

Plate VI.

of Australian Bug, is figured enlarged in the adult stage on Plate VI., Fig. 1, whilst photographs of the pupa and larva are shewn at their natural size in Figs. 2 and 3 respectively. Introduced to Southern Rhodesia from the Cape, to which, of course, it was introduced indirectly from its native home in Australia, this species has become established, at least at Salisbury, and probably elsewhere in the Territory. Until October of the year 1914, however, the writer had never met with this species in Rhodesia at all, every outbreak of Australian Bug that came under his notice being checked by the native Rodolia ladybird. Since that date the Vedalia has accounted for the one or two outbreaks noticed at Salisbury, but since the commencement of the year the Rodolia has accompanied sendings of Australian Bug from Gwelo and Que Que. A mixed attack by the two species has not been recorded in this Territory up to the present.

The pinkish egg of the Vedalia is laid on the white egg sac of the female "bug." The larvæ are reddish when young, and blue grey with reddish sides when nearing full growth. They are almost always covered with a whitish powder. Full-grown larvæ attain a length of nearly one-quarter of an inch. They actively attack both the eggs and the young scales, and on the completion of their growth, which is short, they usually make their way to neighbouring leaves, and change to pupæ inside the split larval skin (see Fig. 2). The length of the adult beetle is slightly under one-eighth of an inch, and the coloration red and black.

The Rodolia Ladybird (*Aulis fœdata*).—This is a larger species than the Vedalia, the beetles attaining a length of between one-sixth and one-quarter of an inch. The coloration consists of red and black, the whole insect having a more or less dusty appearance, owing to the surface being covered with light-coloured short hairs. These hairs are sometimes almost entirely rubbed away in old specimens. The markings are variable, some specimens being almost entirely red and others almost entirely black. Four specimens drawn from nature, illustrating the variation in markings, are shewn at Plate VI., Fig. 4. The larvæ are very like those of the Vedalia, but attain a larger size, full-grown specimens measuring about

one-third of an inch in length. The habits generally are similar to those of the Vedalia. Whilst the writer is unaware of any comparative tests having been made to ascertain whether the Rodolia breeds as fast as the Vedalia, and, therefore, whether it is as effective a check, there is no doubt that in Southern Rhodesia its rate of increase is sufficient to enable it to subdue completely any colony of Australian Bug which it attacks. In addition to the Australian Bug, this species acts as a check to that remarkable insect, the Mammoth or Giant Scale (*Aspidoproctus maximus*), feeding upon the young.

The Two-spot Ladybird (*Chilocorus distigma*).—For the determination of this and the species which follow, the writer is indebted to Dr. L. Peringuey, Curator of S.A. Museum, Capetown. The spots on the wings of the Rhodesian specimens appear to be considerably smaller than in specimens from the Cape Peninsula, whilst the insect itself is somewhat larger. This is a large species, the adult beetles measuring about one-fourth of an inch in length. The colour is shiny black, with two orange-coloured spots in the middle of each wing cover (see Plate VI., Fig. 10). The spiny black and white larva also feeds upon scale insects. This species has been recorded attacking Red Scale, Oleander Scale (*Chrysomphalus hederæ*) and Mammoth Scale in Rhodesia, whilst what was probably the pupa of this species was received, together with those of the Rodolia, from a tree infested with Australian Bug at Que Que.

The Shining Black Ladybird (*Exochomus auritus*).—This species attains a length of about one-seventh of an inch in the adult stage. The colour, as its common name implies, is shining black, but there are two yellow spots on the sides of the thorax (see Plate VI., Fig. 8). It is a common insect, and feeds on both scale insects and plant lice, more especially the latter. In Rhodesia it has been recorded on Red Scale, but it feeds on a wide series of aphides, including the Black Orange Aphis, the Cabbage Aphis, the Wheat Aphis, etc.

The Four-spotted Ladybird (*Lotis neglecta*).—This little ladybird measures about one-fifteenth of an inch in length. It is black, with two red spots on each wing cover (see Plate VI., Fig. 9). It has been noted frequently at Salisbury, feed-

ing upon the Red and the Round Purple scales. It is very common, often abundant, and seems a very useful species.

The Crescent-marked Ladybird (*Chilomenes lunata*).—The adult of this species is shewn, enlarged four diameters, on Plate VI., Fig. 11. The coloration is yellow and black, but in older specimens the yellow tends to change to red. The length of the beetle is rather over one-fourth of an inch. The larva is black, with light yellow spots. An enlarged photograph of a three-quarter grown specimen is shewn at Fig. 12 in Plate VI., the actual length of this specimen being five-sixteenths of an inch. Full-grown larvæ measure as much as one-half inch in length. The eggs are yellow, and laid on end in clumps amongst the louse-infested foliage. This is the commonest ladybird feeding upon the Black Orange Aphis. It attacks many other species of plant lice.

The Black-spotted Ladybird (*Alesia bohemani*).—The beetle is figured on Plate VI., Fig. 7, the actual length being just short of three-sixteenths of an inch. The coloration is yellow and black. This species feeds on Black Orange Aphis, but is not particularly abundant as a rule.

There are a number of other ladybirds which feed on the scales and lice attacking citrus trees, but lack of space precludes further reference to these useful insects.

The Citrus Butterfly (*Papilio demoleus*).—This large and conspicuous insect is too well known to need description. A specimen is shewn at one-half its natural size on Plate VII., Fig. 1. The eggs are whitish, and laid singly on the leaves of citrus trees (see Plate VII., Fig. 3). During the earlier stages of their development the larvæ (caterpillars) are black and white, bearing a notable resemblance to a bird dropping, this being a form of protective mimicry (see Plate VII., Fig. 2). The older green caterpillar, with brown bands across the thorax, is well known. The caterpillar possesses a curious scent organ situated behind the head. This protrudes as two red filaments when the insect is alarmed, giving it a particularly poisonous appearance, calculated to frighten off an enemy, whilst at the same time a strong, distasteful odour is

emitted, proclaiming to insect-eating birds, etc., that this particular caterpillar is not pleasant eating. The pupæ (chrysalides) are attached to the food plant in an upright position, being secured by the tail end and by a sash round the waist. The damage done by this species is rarely serious, although considerable defoliation of young trees sometimes occurs. It is generally controlled by hand, the caterpillar being crushed between the sides of the folded leaf. The butterflies themselves are much attracted to beds of bright flowers, such as zinnias, and numbers can be destroyed in such situations by a boy armed with a net or old tennis racquet.

The Citrus Codling (*Argyroploce lencotreta*).—This insect is also frequently termed the "Natal Codling Moth," but as it is chiefly important as a pest of citrus fruits, the name Citrus Codling appears to be preferable. It should be noted that this insect is quite distinct from the imported Apple Codling (*Carpocapsa pomonella*) which is so destructive to pomaceous fruits in the south. The Citrus Codling is a native insect. In certain seasons this little moth is capable of great damage in carelessly kept citrus orchards, and has been known to render unsaleable up to 70 per cent. of the crop. The damage is, however, often confused with that due to fruit-piercing moths, which will be dealt with later, so that reliable figures as to the actual losses due to the codling are difficult to obtain. The parent moth lays its scale-like eggs singly on the fruit. The newly-hatched larva makes its way through the rind and remains in the pulp of the fruit close to the surface, where it gradually forms a small chamber. Usually one, but sometimes two, divisions or "fingers" of the fruit are affected. The full-grown larva is pinkish yellow in colour, and measures about three-fifths of an inch in length (see Plate VII., Fig. 5). It makes its way out of the fruit, leaving a conspicuous exit hole (see Plate VII., Fig. 6), and pupates in the soil. Mr. Albert Kelly, of the S.A. Union Division of Entomology, gives the following life cycle for this insect when breeding in acorns, a very favourite host in the south :—Egg stage, 8-10 days; larval stage, 84-90 days; pupal stage, 14-18 days. He judges that there are three generations during the year. The life cycle has not been worked out in citrus fruits, but it is probably shorter with respect to the larval stage than

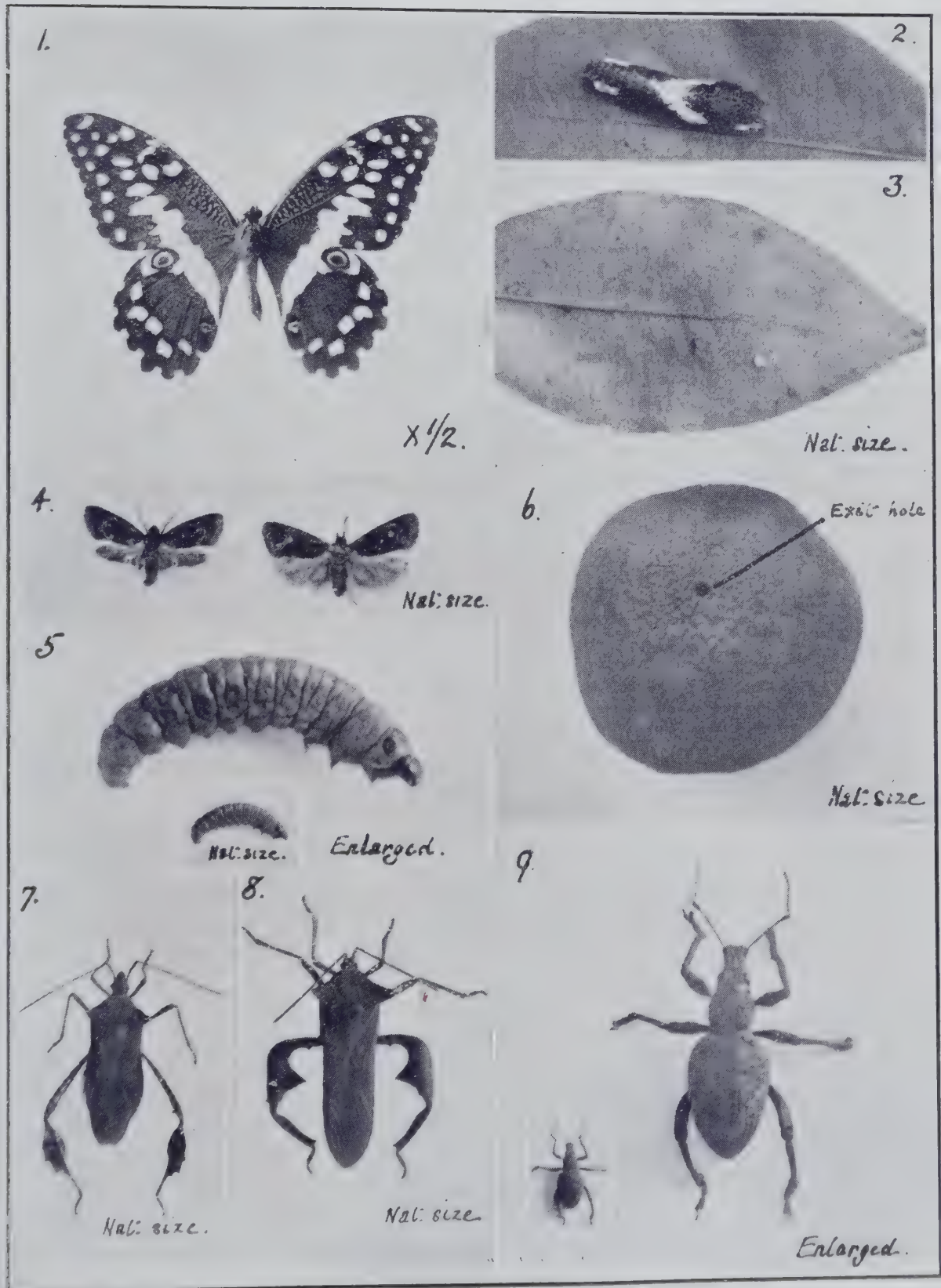

1.
X 1/2.
2.
3.
Nat. size.
4.
Nat. size.
5
Nat. size.
Enlarged.
6.
Exit hole
Nat. size
7.
Nat. size.
8.
Nat. size
9.
Enlarged.

Plate VII.

the above. There appear to be no definite broods of the insect in Rhodesia, adult moths having been bred out during every month of the year (with the actual exception of December), and in considerable numbers in mid-winter (June and July).

Effect on the Fruit.—Infested fruits ripen prematurely and unevenly on the trees, and fall early. On examining such fruit, a discoloured spot will be found, which feels soft on pressure with the finger. On cutting through this soft spot, the cavity of the larva will be revealed partially filled with small grains of excrement, and if the injury is old, generally lined with the velvety growth of a green or blackish mould. The insect itself may or may not be present. The larva, as already stated, actually attacks only a small part of the infested fruit, injuring one or at most two "fingers." Infested fruit is, however, valueless for sale, as the injury allows the ingress of moulds, fungi and bacteria, which cause decay, and the fruit, therefore, will not "keep."

Host Plants.—This species has been bred in Southern Rhodesia from the following cultivated plants :—Orange, naartje, lemon, guava, pomegranate. Mr. R. L. Thompson, Assistant Entomologist, also bred it from two wild fruits, namely, berries of *Zizyphus mucronatus* (1914) and Marula plum (*Sclerocarya caffra*). Endeavours to breed it from wild figs have failed up to the present. In the south the following additional hosts are recorded by Mr. A. Kelly :—Acorns, apricots, peaches, and various kinds of plums. Mr. David Gunn has recently bred it from a wild fruit known as the Zuur plum in the Transvaal.

Repressive Measures.—Really heavy damage from Citrus Codling has only been recorded at present in neglected orchards where the fallen fruit is allowed to lie and rot on the ground, or in orchards where alternative hosts to the citrus fruits, such as pomegranate or guava, are growing near at hand. The obvious method of checking the pest is to collect and destroy infested fruit as a regular practice, and to eliminate alternative hosts as far as possible, both native and cultivated. It should be remarked that "out of season" citrus fruits help to maintain the numbers of the insect during periods of scarcity of other hosts. It will be seen, therefore, that such

fruits are a source of danger, and should be avoided. Mr. A. G. Turner, Citrus Adviser, informs the writer that by a proper system of irrigation this irregular bearing is done away with, and that therefore in properly managed commercial orchards the menace of out-of-season fruit should not exist. If these matters are attended to, Citrus Codling appears unlikely to prove a serious trouble as far as can be foreseen in the present undeveloped state of the industry.

Fruit-piercing Moths.—Fruit-piercing moths, or "Fruit Moths" as they are sometimes called, have long been known as serious pests to soft fruits in many parts of South Africa, being fortunately absent, however, from the great fruit-growing districts of the Western Province of Cape Colony. Injury to citrus fruits, on the other hand, does not appear to have been noted as the cause of appreciable loss in the S.A. Union, although recorded many years ago in Australia, India and probably elsewhere in the East. The moths which possess a proboscis or beak strong enough to pierce the rind of an orange are limited in number, although numerous species are capable of piercing plums, peaches and the like. Two species at least are common to Rhodesia, India, Australia and the East Indies, namely, *Othreis materna* and *O. fullonica*, both of which are shewn on Plates VIII. and IX. A third species, *O. divitiosa*, is much less common. These are large handsome moths, with the fore wings marked with various shades of brown, green and silvery grey, and the hind wings of a bright orange yellow, margined with black, and with a black spot in the centre of each. In the "Queensland Agricultural Journal" for 1898, Mr. Henry Tryon published an account of the attack of these insects on citrus fruits in Australia, reproducing also figures of the larvæ and of their food plants. Statements as to the ability of any moth to pierce the rind of an orange had up to that time been received with a certain amount of scepticism. Not only is this ability definitely proved in the case of these large moths, however, but recent observations by Mr. R. L. Thompson, at Umtali, have shewn that a much smaller moth belonging to a different sub-family possesses a similar habit. A female of this species is shewn on Plate IX., Fig. 4. The species has not yet been ascertained, so the reader is asked to refer to it by the number

it bears in the office records, namely, No. 770. During January, 1915, this moth was strongly suspected of piercing plums and peaches at Salisbury, and an examination of its proboscis, a photograph of which, greatly enlarged, is reproduced on Plate IX., Fig. 3, did not tend to lessen this suspicion. Mr. Thompson, however, was able to watch the whole operation of the insertion of the proboscis into an orange at Umtali, and so settled the question once and for all. As may be seen by an inspection of the enlarged figures of the two probosces on Plates VIII. and IX. respectively, these moths are provided with implements specially adapted to the task of piercing tough rinds. The vast bulk of butterflies and moths possess soft "tongues" suited for imbibing honey from flowers, and other liquids. The comparatively short, stout "trunks," with sharp horny tips, possessed by our citrus-piercing species, are very unusual, and almost sufficient in themselves to convict their owners of nefarious habits.

Nothing is known of the life histories of these moths in this Territory. Tryon gives the following description of the larvæ of three species of Othreis, including the two mentioned above :—"All three insects have caterpillars of similar cylindrical form, measuring two or more inches in length when fully grown. They have the eleventh segment of the body considerably humped. Otherwise they are quite even and smooth. They are unclothed, save for the presence of minute hairs. Like other *Noctuæ*, they have each eight pairs of legs, viz., three thoracic clawed, and one terminal, and four intermediate unclawed ones—the anterior pair of the last group being rudimentary. In each case also the caterpillars vary in colour at different periods of their growth, but have in common two large spots or *ocelli* on either side of the body occupying nearly the entire breadth of the sixth and seventh segments. These spots are very conspicuous, being white, and often coloured with very marked hues." The food plants recorded by Tryon are various species of a family of climbing plants, the *Menispermaceæ*. This family is represented in Rhodesia, but it is not known whether the genera found here support the caterpillars of these moths or not. The moths are strong fliers, and capable of covering considerable distances in search of food. They appear about the fruit trees at dusk, and can

be watched sucking the fruit by the light of a lantern, as they are not very easily disturbed by light when feeding. In certain seasons these, and other moths of fruit-piercing habits, are very abundant, and do a great amount of damage, whilst in others they are comparatively scarce. Last season (1914-15) was particularly favourable to them, especially during the months of January and February. After March, injury from these pests seems to decline greatly, although citrus fruits would appear to be in better condition for attack than during the preceding months.

Effect on the Fruit.—Oranges are frequently attacked whilst still green, and may be pierced by more than one moth. The area surrounding the perforation becomes yellow and bears a bruised appearance. This is followed by localised rotting of the fruit, which falls prematurely from the tree. The injury may be readily distinguished from that of the Citrus Codling, if the larva of the latter is not present, by the absence of the pellets of excrement, as well as by the fact that the perforation is very much smaller than the exit hole of the codling larva. It is not always so readily distinguished from that due to one or other of the fruit flies (*Ceratitis spp.*), insects which sometimes infest citrus fruits, but not in our experience to any serious extent in this Territory. The absence of maggots and the presence of a distinct perforation, however, indicate as a rule the work of a fruit-piercing moth, though the bug shewn on Plate VII., Fig. 7, may possibly be responsible for somewhat similar injury. Injuries from fruit-piercing moths have been worst amongst the early ripening varieties of oranges, especially Washington Navel, up to 50 per cent. of the crop having been reported as the loss in one instance. The reason for this appears to be that these oranges are thinner skinned than other varieties, and are more or less sweet whilst the moths are abundant and other citrus fruits are still sour, a "Navel" orange being sweet to the taste even whilst still green.

Besides attacking oranges, these moths are very partial to peaches, plums, apples, bananas, mangoes, grapes and other fruits, whilst No. 770 will even attack and pierce hard quinces with apparent relish. They do not always pierce fresh fruits,

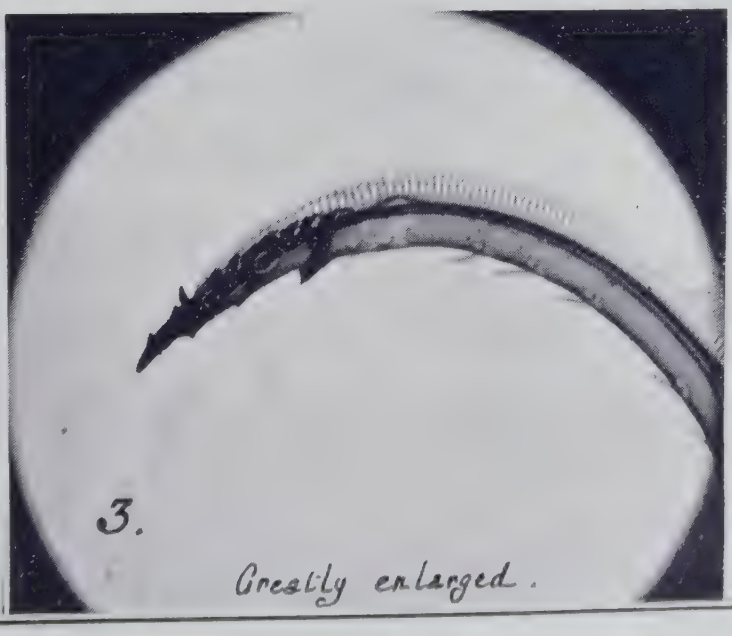


Plate VIII.

but will suck away freely at fruit injured by birds, fruit-eating beetles and other agencies.

The Question of Remedies.—At the present time no more practicable method of avoiding or mitigating the ravages of these pests is known than the enclosure of the trees in a coarse grade of mosquito netting, and this procedure, although frequently adopted in private gardens, is not likely to commend itself overmuch to the commercial fruit grower. What is urgently needed is an efficient counter attraction for the moths. For this purpose Tryon recommends the use of highly-flavoured bananas of the "Cavendish" type, which in Queensland apparently grow in the same localities as the citrus trees. We are, unfortunately, not so favourably situated in this respect, our climate not being suited for the growth of the better varieties of bananas, although in the Umtali district, at any rate, bananas could be imported cheaply from over the Portuguese border. The method recommended is to hang the overripe fruit in calico or muslin bags at points that can easily be visited, and to net or destroy the moths that come to the bait, or to impregnate the bait with a soluble compound of arsenic (such as arsenite of soda), and allow the moths to poison themselves. Of the practical efficacy of this method the writer has no information, arrangements for making tests during the present season having given no result, owing to the failure of the moths to appear in adequate numbers. Along these lines, however, it is felt that the best hope of success lies, and a full series of tests with counter-baits is planned for the next season that the moths are sufficiently abundant.

Leaf-eating Beetles.—Occasionally certain species of beetles attack the foliage of citrus trees, but rarely to a serious extent. Two species of "Snout Beetles" (*Systates sp.* and *Periscopelta mutabilis*) have been complained of in this respect. An enlarged photograph of the Systates is shewn on Plate VII., Fig. 9, with a life-sized figure adjoined. This beetle is otherwise known as the "Maize Snout Beetle," as it came to notice first of all in December, 1910, as a bad pest of maize, and was referred to on that account in the *Agricultural Journal* for February, 1911. Maize and citrus trees are widely different plants, but it is nevertheless a fact that the same beetles feed freely on either. The beetles feed on the edges of the leaves,

eating thence inwards, and their injury is easily recognised. The other snout beetle, *P. mutabilis*, is not unlike Systates, but is striped longitudinally with numerous light lines. It has only come to notice as a pest in one instance—in the Hartley district. These beetles have the habit of feigning death and dropping when disturbed, and they can easily be jarred from the trees in the evening on to sheets spread underneath, and so collected and destroyed. Spraying the trees thoroughly with arsenate of lead at the rate of 3 lbs. to 50 gallons of water is likely to prove an effective remedy, but has not been tested.

Bugs.—Two species of bugs, belonging to the family Coreidæ, have been reported as injurious to citrus. The one shewn on Plate VII., Fig. 8, is known to pierce and suck the growing shoots, causing them to wither at the tip. An allied insect (*Holopterna valga*) of similar habits is known as the "Wither Tip Bug" at the Cape. The specimen figured is a male, the female lacking the conspicuous dilatation of the hind legs. The second species (Plate VII., Fig. 7) was once forwarded in November from Umvuma, with the report that it was abundant, and had the habit of piercing and sucking oranges and naartjes (but this evidently referred to out-of-season fruit). The species occurs also at Salisbury, and has been recorded puncturing green granadillas in October, the perforated fruit withering as a result. There is thus no evidence as yet that this bug is likely to prove a pest of the main crop of citrus fruits.

Insects of this nature can only be dealt with by hand picking, and if abundant, boys should be provided with tins containing a little water, with a layer of paraffin at the top, and should be directed to knock the bugs from the trees into these receptacles, where the paraffin will prove fatal.

* * *

This concludes the present account of the citrus pests of Southern Rhodesia, as ascertained up to date. A number of insects which feed or are found on citrus trees have not been included, owing to the fact that they have shewn no signs of being of practical importance as yet. These are included in the following list :—

(1) Oleander Scale (*Chrysomphalus hederæ*) occurs frequently on lemon trees, chiefly affecting over-ripe fruit, but also found on the foliage and on green fruit. It has never been abundant enough to call for treatment by itself. This is the white scale that smothers the trunks of Syringa trees so persistently in Rhodesia.

(2) A species of Soft Scale, larger and quite distinct from *Coccus hesperidum*, was once forwarded on orange twigs from Gatooma.

(3) Mealy Bug.—A species of this sub-family has been found on citrus trees at Umtali, but not in sufficient quantity to constitute a pest.

(4) Cicada Injury.—On two occasions citrus trees have been severely injured by the egg slits of a species of Cicada ("Christmas Bee"). This occurred on newly-cleared ground, the plantation abutting on woodland. Such occurrences are very rare, and cannot be guarded against.

(5) Bugs Swarming on Trees.—Two species of bugs of the family Pentatomidæ, commonly known in Rhodesia as "Stinking Bishops," namely, *Agonoscelis puberula* and *A. erosa*, sometimes swarm on citrus, amongst other trees, in the winter, completely covering the trunks and branches. Curiously enough, they have not been convicted of any damage.

(6) Tortricids.—Two species of Tortricid moths, quite distinct from the Citrus Codling (*Argyroploce leucotreta*) have been bred from oranges. They are far too scarce at present to be of any importance.

(7) Slug Caterpillars.—A species of slug caterpillar (*Limacodidæ*) was found feeding on orange at Lalapanzi on one occasion, but the damage was not appreciable.

(8) Beetle Borer.—Portions of branches of citrus bored and killed by the grub of a beetle, probably one of the Longhorns (*Cerambycidæ*), were sent to the office on one occasion. This form of injury has not been noticed in any orchard visited.

(9) Fruit Flies (*Ceratitis spp.*).—Citrus fruits are occasionally "stung" by fruit flies, two species having been bred from such fruit in Rhodesia, namely, the Mediterranean Fruit Fly (*Ceratitis capitata*) and an undetermined species, probably native. The damage has not exceeded a fraction of one per cent. of the crop in any instance.

For information concerning Termites (White Ants) which sometimes attack citrus trees, the reader is referred to an article entitled "Termites or White Ants," which appeared in the number of this *Journal* for February, 1913. Reprints may be obtained at the Department of Agriculture.

EXPLANATION OF PLATES.

Plate IV.—Orange shoot grossly infested with Black Orange Aphis.

Plate V.—Foliage of citrus infested with Citrus Psylla, shewing characteristic pockets in the leaves.

Plate VI.—Fig. 1. Vedalia Ladybird (*Novius cardinalis*) adult; enlarged 4 diameters.

Fig. 2. Vedalia pupa on citrus leaf; natural size.

Fig. 3. Vedalia larva, full grown, on citrus leaf; natural size.

Fig. 4. Rodolia Ladybird (*Aulis fœdata*); 4 colorations; enlarged 4 diameters.

Fig. 5. Rodolia pupæ on citrus leaf; natural size.

Fig. 6. Rodolia larvæ, full grown, on citrus leaf; natural size.

Fig. 7. Black-spotted Ladybird (*Alesia bohemani*); enlarged 4 diameters.

Fig. 8. Shining Black Ladybird (*Exochomus auritus*); enlarged 4 diameters.

Fig. 9. Four-spotted Ladybird (*Lotis neglecta*); enlarged 4 diameters.

Fig. 10. Two-spot Ladybird (*Chilocorus distigma*); enlarged 4 diameters.

Plate IX.

Fig. 11. Crescent-marked Ladybird (*Chilomenes lunata*); enlarged 4 diameters.

Fig. 12. Crescent-marked Ladybird (*Chilomenes lunata*); larva; enlarged.

Plate VII.—Fig. 1. Citrus Butterfly (*Papilio demoleus*); one-half natural size.

Fig. 2. Citrus Butterfly (*Papilio demoleus*); half-grown larva; natural size.

Fig. 3. Citrus Butterfly (*Papilio demoleus*); egg on citrus leaf; natural size.

Fig. 4. Citrus Codling (*Argyroploce lencotreta*); adult moths; male and female; natural size.

Fig. 5. Citrus Codling (*Argyroploce lencotreta*); full grown larva; greatly enlarged and natural size.

Fig. 6. Orange shewing exit hole of Citrus Codling larva.

Fig. 7. Coreid Bug, reported to pierce citrus fruits; natural size.

Fig. 8. Coreid Bug, which causes withering of shoots by piercing them and sucking the sap; male; natural size.

Fig. 9. Leaf-eating Beetle (*Systates sp.*); greatly enlarged and natural size.

Plate VIII.—Fig. 1. Fruit-piercing Moth (*Othreis fullonica*); male; natural size.

Fig. 2. Fruit-piercing Moth (*Othreis fullonica*); female; natural size.

Fig. 3. Proboscis of above; greatly enlarged.

Plate IX.—Fig. 1. Fruit-piercing Moth (*Othreis materna*); male; natural size.

Fig. 2. Fruit-piercing Moth (*Othreis materna*); female; natural size.

Fig. 3. Proboscis of Moth No. 770; greatly enlarged.

Fig. 4. Fruit-piercing Moth No. 770; female; natural size.

Witch Weed or Rooi-Bloem.

(*STRIGA LUTEA.*)

A NEW PEST OF THE MAIZE CROP IN RHODESIA.

By J. A. T. Walters, B.A., Assistant Agriculturist.

In the month of February some stunted maize plants were sent from the Mazoe valley to the Department of Agriculture for examination. On the roots of one of these plants were found specimens of a scarlet flowered weed known as the "witch weed." This witch weed is a parasitic plant drawing its sustenance from the roots of the maize plant, as a result of which the mealie never grows into a strong healthy plant, but remains short and stunted, often failing to produce a cob. This pest spreads very readily and rapidly over the mealie lands, so that in a few years what had formerly been excellent land becomes useless for this crop. Indeed, in the Union its ravages have been particularly severe in some districts, rendering large tracts of cultivated land useless for the growing of maize. Only on one previous occasion had the writer known of the existence of this pest in Rhodesia. This was on a farm in the Chilimanzi district in 1913. Its presence in the centre of the principal maize-growing area of the country came as an unpleasant surprise, and an immediate visit was made to the infected farm and to a few of the neighbouring farms, but only on the first farm were any plants found in the maize fields. Since then, however, it has been ascertained that the occurrence of the pest has been noted on over half-a-dozen other farms, and the seriousness of the danger to be apprehended from the spread of this weed can hardly be over-estimated. Fortunately, in its early stages this pest can easily be overcome, and it is to be hoped that farmers will give it their

serious attention before its spread has ruined their lands for maize growing. Mounted specimens of this weed have been prepared and are available for distribution to the farmers' associations, so that individual farmers may be helped to recognise the plant.

The method of combating this pest is simple. It must be hoed out of the ground as soon as it makes its appearance; and, if the plants have flowered, it will be well to gather them and burn them in order to prevent them from setting seed. It is computed that a single plant frequently produces a thousand seeds, and it is known that these seeds retain their germinating power for years. It is thus seen that neglect for a few seasons will firmly establish this pest, while vigorous hoeing at the start will eliminate it altogether.

The witch weed does not make its appearance above ground until the month of January or later, but its presence can often be suspected earlier by the stunted and unthrifty appearance of the mealie plant even in good seasons. Although the seed is exceedingly fine, it seems to be able to germinate at considerable depths, particularly when near a mealie root. The roots of the witch weed very soon attach themselves to the roots of the maize, which thus serves as a host plant. It thus frequently happens that a number of leaves are formed before the weed reaches the surface, and these pale purplish leaves are usually sufficient to determine the pest definitely. As the leaves appear above ground they become green, and before long clusters of bright scarlet flowers are produced, but the leaves always remain rather insignificant when compared with the brilliant colour of the flower. The plant rarely exceeds 12 inches in height. If allowed to set seed, it will be found that the following season a circular patch of these plants will appear in the maize lands, and that in subsequent seasons this patch will extend in all directions if the plants are allowed to seed. In this way whole mealie lands may be infested and rendered unfit for maize production. It is a significant fact, however, that practically no other crop is attacked by this pest, and lands that are rendered unfit for maize may be put down to almost any other crop. In view of this fact, it was thought that rotation with other crops would render the land again fit for mealies, but it has repeatedly

been shewn that, when once infested badly with witch weed seeds, the pest will make a re-appearance when mealies are again planted, even after a long interval under other crops. The importance of eradicating this weed early thus becomes evident, and it cannot be too strongly urged upon farmers to keep a constant lookout for it on their lands, and to take vigorous measures to exterminate it promptly.

The danger from infection is always with us, as the plant is indigenous to South Africa, and often appears as a parasite on grasses on the veld. It is only, however, in maize lands that it seems to thrive without restraint, and to spread without check. Various methods of preventing this weed from germinating have been suggested, and careful trials have been conducted under the guidance of the Union Department of Agriculture. Professor Pearson issued a report on these trials, in which applications of common salt, with and without nitrate of soda, were made in varying quantities. But no very marked improvement was noticeable. One sentence from this report is worthy of careful notice:—"A badly-infected maize crop left to itself until the witch weed seeds may be sufficient to spread the pest over many square miles of ground." This pest has been receiving the anxious attention of farmers in the Union for many years. So far in Rhodesia the pest has been practically non-existent. It is "up to" every farmer to see that this danger, which is ever present, shall never be allowed to attain dimensions which, besides rendering his own lands unfit for maize, will also be a constant threat to his neighbour's lands.

How to find the Capacity of a Dipping Tank.

(1) Reduce all dimensions to the same denomination, feet or inches.

(2) Add the length of the bottom of the vat to the length at the water line.

(3) Add the width of the bottom to the width at the water line.

(4) Multiply these sums (2) and (3) together.

(5) Multiply the length of the bottom by the width of the bottom.

(6) Multiply the length at the water line by the width at the water line.

(7) Add together (4), (5) and (6).

(8) Multiply this sum (7) by one-sixth the perpendicular depth from the water line to the bottom, which gives the capacity of the tank in cubic feet or cubic inches—naturally depends on the denomination; see (1).

(9) If the capacity in cubic inches has been obtained, divide (8) by 231; if the capacity in cubic feet has been obtained, divide (8) by 0.1336. In either case the result will be the capacity of the vat in gallons.

If the tank is level, the above method is mathematically accurate, but if it is set so that it is slightly lower at one end than the other, as is usual, the true capacity cannot be obtained by this method. If, however, the figures for the width at the water line and the depth are taken from measurements at the *middle* of the tank, the results obtained will vary only very slightly from the actual capacity.

Farm and Live Stock Statistics in Southern Rhodesia

FOR THE YEAR ENDED 31st DECEMBER, 1915.

By Eric A. Nobbs, Ph.D., B.Sc., Director of Agriculture, and B. Haslewood, F.S.S., Statistician.

The first interesting fact that emerges from the mass of detail accumulated under the system in force for collection of statistics is the fundamental one of the number of farmers in Southern Rhodesia. We find that at the end of 1915 there were 1,751 European farmers, and that the number of farms actually worked was 2,145. Many men are away on active service, and have either removed their live stock elsewhere, leaving their farms idle, or have placed them and their farms in charge of neighbours. In spite of this temporary reduction, we find a small advance over last year's figures, a sign that progress is by no means altogether suspended. The numbers of farms and farmers in each district will be read with interest, Hartley holding pride of place.

In the tabular statement, next to the column shewing the number of farmers, will be found one shewing the distribution and numbers of cattle dipping tanks, from which it will be seen that there are now 595 tanks in the country, or one to every 3.6 farms, a very high ratio indeed, and an increase of 168 during the year. There is still, however, room for improvement in this direction, on the grounds of both individual benefit and the public safety, and the position of different districts is clearly brought out in the accompanying tabular statement.

The grand total of Europeans' and natives' cattle in Southern Rhodesia at the end of 1915 was 840,926 head, repre-

senting an increase of 92,868 head over the figures of last year, which were 748,058 head. This is an increase of 12.41 per cent. per annum, which would mean that the cattle of this country would, at present rates, double themselves in six years. At this rate of increase the total number of horned stock at the end of 1916 should reach about 940,000 head, and in the following year should exceed 1,000,000 head. These very considerable figures emphasise the need of finding a means of disposing of our surplus cattle, and incidentally justify the recent opening of markets in the south, and suggest the urgent desirability of developing a meat packing industry in the country, with the assurance of a reliable and steady supply of slaughter stock.

The European-owned cattle numbered at the end of last year 394,856 head, an increase of 52,978 head, or 15.49 per cent., a figure that is the more satisfactory in that all ages and both sexes are represented in their full proportion. At the same rate the numbers would double themselves in five years. Much fewer cattle have been bought from native sources during the year under review than in previous seasons. The importations into the Territory numbered 6,387 head, as against 6,359 head in 1914, and were made up of 374 bulls and 2,174 heifers from the Union, 41 bulls and 37 heifers from the United Kingdom, together with 3,761 head of slaughter stock from Northern Rhodesia prior to the suspension of this traffic, owing to the outbreak of lungsickness in Barotseland.

Comparing the two Provinces, we find that the number of cattle in Mashonaland was 231,714, an increase of 27,331 head, or 13.3 per cent., during the year. The corresponding figure for Matabeleland was 163,142 head, with an increase of 25,647, or 18.6 per cent. It will thus be seen that whilst Mashonaland maintains at present much the larger number of cattle, the rate of increase in Matabeleland has been considerably greater, indeed quite remarkable, in the year under review. When the figures are scrutinised, however, we find that this abnormal increase was, to a very great extent, localised in one or two districts, as, for instance, in Gwanda, where it reached 23.7 per cent., and is clearly attributable to augmentation of individual herds by purchase. Corroborative evidence of this is furnished by the fact that on one of the

largest ranches in Matabeleland, carrying over 20,000 head, the increase amounted to as much as 37.4 per cent. Also of the cattle imported from the south, the greatest proportion, nearly all in fact, have gone to Matabeleland.

The figures for the various districts given in the accompanying table will no doubt be scrutinised with interest by the residents therein. Certain districts shew changes not in keeping with the general trend, though such can usually be accounted for either by the rendering of new returns or by alterations of boundaries or, a most satisfactory feature, by greater accuracy in the figures furnished. Always, no doubt, there will be room for improvement; so far the trend is all in the direction of enhanced accuracy. It is interesting to observe that Melsetter furnishes a material increase in the number of horned cattle, in spite of the presence of African Coast Fever in the district. The districts carrying most cattle are contiguous and rank in the following order:—Gwelo, Mazoe, Hartley and Salisbury—Mazoe having surpassed Hartley by 330 head since the returns of a year ago were made up. In this connection it must be borne in mind, however, that all districts are not of equal size, and their position as regards number of cattle must not be taken too strictly as an indication either of their suitability for stock or their degree of development. It is quite possible that some of the more remote and undeveloped districts will, ere long, take the lead in cattle production.

As has already been stated, the increase last year of European cattle was close on 53,000 head, but in view of the fact that cows and heifers over one year old number 192,815, it is reasonable to expect that this year will see a natural increase of double that of last season, thus bringing the numbers of European-owned cattle in Southern Rhodesia to something over half a million head.

There has been a notable reduction in calf mortality throughout the country, and there can be no doubt that this welcome state of affairs can be traced to the rapid spread of the practice of dipping. One of our larger ranches, carrying over 20,000 head, reports having brought down the losses in calves duing the first year of life from 10 per cent. to as low as 4 per

cent. At the same time isolated instances of unduly heavy loss of young calves have also come to notice.

The number of bulls is 5,307, or 1 to every 36.3 cows and heifers, as against 4,358, or 1 to 38.3, last year, shewing a tendency in the right direction, which, with the steady improvement in the quality of sires in use, is bound to be exerting a beneficial effect on our herds. Of these 5,307 bulls, the returns shew that 906 belong to pure breeds. Other bulls, oxen of all ages and bull calves numbered in 1914 129,664, and in 1915 151,928, of which 61,985—or 40.8 per cent.—are described as working oxen, *i.e.*, close on 4,000 spans.

The total number of cattle owned by natives is given as 446,060 head, against 406,180 head the previous year, an increase of 39,880 head, which is at the comparatively low rate of 9.82 per cent. per annum. These figures are admittedly based on very conservative estimates, and the apparent low rate of increase is no doubt attributable to this, rather than to any other cause; though no doubt the position is to some extent influenced by the sales effected by the natives, and by the larger proportion of bulls, oxen and old cows kept by them.

The prime importance that lies in the improvement of our cattle by grading up with European breeds suitable to the country is now thoroughly appreciated by the farming community, and is generally accepted without question. The possibility of improved stock thriving in Rhodesia is no longer doubted, though the extent to which this grading up may safely be followed is still open to argument. The accompanying table shewing the number of pure-bred cattle belonging to European farmers in Rhodesia will, therefore, be read with intense interest, not only by our own farmers, but by breeders in the Union and at Home who supply us with pure-bred stock; and also by the several Breed Societies which exist for the purpose of furthering the interests of their respective breeds. The information contained herein is altogether new, no such data having been collected previously, and it will therefore be found particularly instructive. The compilation of this table and its value, of course, depend entirely on the accuracy and pains taken by individuals in filling up the

returns called for; and while it is recognised that allowance must be made for the possibility of occasional error, still it is confidently hoped that any such error is only very small and capable of progressive diminution and eventual elimination in future years, as the purpose and value of the information so obtained come to be appreciated by individual owners of pure-bred stock.

RETURN OF PURE-BRED CATTLE IN SOUTHERN RHODESIA ACCORDING TO BREEDS, 1915.

	Total.	Bulls.	Cows and Young Stock.
Shorthorn	602	279	323
North Devon	308	148	160
Friesland	247	121	126
Africander	197	34	163
Hereford	181	123	58
Sussex	127	94	33
South Devon	125	34	91
Aberdeen Angus	70	46	24
Ayrshire	24	10	14
Jersey	22	5	17
Red Poll	22	12	10
	1,925	906	1,019

All the cattle referred to in the above table are classed as being pure-bred, and are believed to be such or were bought as such, although not all are entered in the stud books of the various Breeders' Associations. The total of 1,925 head is larger than might have been anticipated, and speaks well for the success of the more important breeds which have been on trial for many years in this country. Bulls number 906, and are chiefly running with grade or native herds. The popularity, suitability and distribution of the different breeds is clearly brought out in the columns of the general statistical table.

The Shorthorn breed is always the most popular and common in English-speaking communities: it embraces under the heading here shewn both the Shorthorn proper and the

Lincoln Red. It has not been possible yet to discriminate between the meat and the dairying and the dual purpose types of the breed in the preparation of these tables. There are several stud herds of Shorthorns now in the country belonging to private individuals and to the larger ranching companies, and the large number of cows and young stock—323—indicates that a serious effort is being made to supply locally-bred bulls for the purpose of grading up our herds. A noteworthy feature is the even distribution of Shorthorn bulls in every district, and in such approximating ratio to the total number of cattle in each.

The next place in apparent popularity is held by the North Devon breed, which also is found to have a large number of females and young stock, sure proof of the vigorous efforts that are being made to provide locally-bred bulls of this hardy and useful meat breed. The North Devons appear to have established themselves especially in Matabeleland, where they run the Shorthorn close, although they are also well represented in the sister Province.

In point of numbers the Friesland rank third, although almost as numerous as the North Devon. As nearly as possible half are cows and young stock, so that here again locally-bred bulls should be freely obtainable. Frieslands preponderate in Mashonaland, especially in Salisbury and Hartley districts, where dairying is actively pursued.

Africanders also are strongly represented, but the statistics bring out the rather remarkable fact that there are only 34 bulls to 163 females and young stock. This is due apparently to the presence of fairly large stud herds in the districts of Bulawayo and Gwanda, which account for 151 cows and young stock between them. Of this breed there are remarkably few, only 12 in fact, recorded from Mashonaland, and there all but one are bulls.

Herefords are almost as numerous as Africanders, and actually there are two more bulls of this than of the Friesland breed in the country, and many more than of the Africander. The total number is made up mainly of bulls, although stud herds are found in the districts of Nyamandhlovu, Bulalima-Mangwe and Charter. The bulls in question are fairly equally

distributed over the country, shewing their general suitability to our conditions, and there is reason to think that this breed is growing in popularity. There has, however, always been a difficulty in obtaining pure Hereford bulls in Rhodesia or from the Union in numbers equal to the demand, and sufficient to render the breed as common in the country as otherwise it would be.

The Sussex breed stands next in point of numbers with 127, of which 94 are bulls. Small stud herds are found near Salisbury and on the Liebig Ranch, in the Gwanda district.

With only two less in actual numbers, but with the position almost exactly reversed in point of sex distribution, we find the South Devons next in popularity; this breed being concentrated to a marked extent in the district of Insiza.

The remaining breeds are all much less strongly represented, and are also restricted in their distribution, as shewn in the general tabular statement attached. It will be exceedingly interesting in time to come to watch the progress of the various breeds as recorded by the statistical tables.

The general returns give 5,307 as the total number of bulls in use by Europeans, and of these we find 906 are of pure breed, the remainder, forming the great majority, being still cross-bred or native animals. Competent critics assure us, and our breeders generally agree, that the chief need which should be our objective in breeding must be to intensify the aptitude of our cattle for producing beef or producing milk, as the case may be. This is to be achieved by the introduction of bulls of the well-known European breeds, coupled with improved methods in the care and feeding of the stock. Our need of more and better class bulls constitutes the most urgent requirement of the cattle industry of Rhodesia to-day. Opinions may differ as to breeds, and whether it is more advisable to import bulls from England or from the south, or to breed and rear them in this country; in practice all these methods are in force, and many breeds are represented. There is no question, however, as to the need for improvement of our herds, nor as to the wisdom and possibility of achieving it. The figures here given shew that much has been done, more perhaps than is commonly supposed, but the fact is also made clear that

there is still much room for further advance in the desired direction.

The total number of horses in rural districts, exclusive of all horses kept in townships or by the non-farming community, and Police horses, shews a diminution of 365 as against the previous year, owing to the serious outbreak of horse-sickness; and this decrease is the more notable in the face of an importation of 593 horses during the year, all of which duly passed the mallein test. These figures give a fair idea of the mortality suffered, and should be of peculiar interest to prospective insurers of horse flesh. At the same time the smallness of the total number of available horses has a peculiar significance to those concerned with military matters. It certainly bears out the contention of many that the motor car and bicycle are not only a luxury to the Rhodesian farmer, but a useful economy.

The figures relating to mules are really more important from a farming standpoint, and they shew a small increase on the whole, in spite of a diminution in Matabeleland. These figures are inclusive of imported mules to the number of 293, all of which were duly subjected to the mallein test on admission. The donkey, although diminishing, still retains its importance amongst equines in the development of this country, which still boasts over 10,000 of these humble but indispensable factors in transport.

Goats and sheep, both Merino and all other classes, shew a marked falling off, the weather last season having been very unfavourable. It would appear that it is still only possible to keep sheep profitably in this country in small flocks and on tamed veld, whilst adequate housing against the heavy rains, and some practical knowledge of sheep farming, are alike very necessary, and often wanting. Merinos diminished by 4,320, or 30 per cent., and other sheep, mainly native and cross Persian and Africander, by 12,696, or 24 per cent.; and goats by 8,799, or 25 per cent.

As regards pigs, there is a very different tale to tell. There has been a satisfactory mortality at the factory of 1,240 head, or over 9 per cent. of last year's total number of animals in the country, viz., 13,119; and, in spite of this, there has been

an increase of 6,531, or as nearly as possible 50 per cent., making the total number at the end of 1915 19,650 pigs. Allowing for the normal rate of increase of this useful class of farm stock, and in spite of the short life which it enjoys, this foreshadows a very much larger increase in the present year, and a correspondingly larger supply to the factory, which is understood to be still working far below its capacity. It is interesting to note that the increase in the number of pigs is distributed over the entire country, although it is larger in the arable districts; and it is a fair inference that it is due entirely to the existence of a ready market in the form of a bacon factory, and to the reciprocating results of its successful working.

The position with regard to butter is also very encouraging. The local production in 1915 amounted to 294,568 lbs., and the importation, according to Customs returns, was 129,078 lbs. In the previous year local production was 256,747 lbs., and the importation 189,942 lbs. It will thus be seen that importation has been reduced by over 60,000 lbs., or 32 per cent., whilst local production has increased by nearly 38,000 lbs., or 15 per cent. Whilst the factory is rapidly increasing its output, and has during the year added to its churning capacity very materially, it is evident that a large amount of butter continues to be made on the farms; and it may be noted with regret that in some districts the only profitable use that can be made of the superfluous and unsaleable butter is to convert it into the more immediately necessary and utilisable form of soap. Corresponding with the increase of butter, we find the production and sale of cream from the farms steadily increasing, and side by side with this a growing market for fresh milk, a commodity which will always command a ready sale in those districts within reach of our many consuming centres in towns, villages and mines.

It would seem as if the figures relating to poultry and eggs are somewhat less reliable than those furnished by the farmers with regard to their bigger lines of business, and it is not quite possible to accept without qualification the figures as returned. That poultry should have decreased even slightly in numbers in these hard times, when the minor sources of revenue have to be closely watched, is hardly credible; nor can

such decrease be readily explained by the increased marketing of 10,000 dozen eggs, on the assumption that the farmers are selling eggs in preference to raising chicks. Perhaps the fact that there is an undoubted tendency towards keeping a better class of fowl, if fewer of them, may help to explain these remarkable figures. However, accepting the fact of a marked increase in egg-production locally, we have some confirmation in the corresponding reduction of importations as given by the Customs returns, which for 1914 were 203,361 lbs., or, say, 144,000 dozen, as against only 94,340 lbs., or 66,800 dozen eggs, in 1915. The inference may at least be fairly made that there is a tendency for the local article now to replace the imported one; although, as egg-production fluctuates at certain seasons, it is probable that we can never entirely prevent their introduction from other countries where conditions of climate enable the fowls to lay abundantly at just the season when eggs are scarce in our own land.

On many of the returns forwarded to the Statistician by farmers, interesting comments have been inserted regarding the mortality of cattle and other stock of all ages from the depredations of leopards and lions, chiefly the former, and, in certain districts, of wild dogs. No precise figures can be given from the information furnished, but losses from this cause were by no means infrequent, especially in the more outlying districts.

In concluding these notes, it is a pleasing duty again to have to acknowledge the courteous and hearty co-operation of the farming community as a whole in the furnishing of the individual returns from which these general statistics have been compiled; and these individual returns in themselves give ample evidence of having been prepared with a fuller and more painstaking accuracy even than those of a year ago at the initiation of the system.

Estimates of the Maize and Tobacco Crops, 1915-16.

By Eric A. Nobbs, Ph.D., B.Sc., Director of Agriculture, and B. Haslewood, F.S.S., Statistician.

It is particularly difficult this season to prepare a forecast of the maize crop. The early part of the season, especially in the chief maize-growing districts, was exceptionally favourable, and from these parts it is reported that the early sown crops are the best. Elsewhere, over the greater portion of the country, but where returns are normally lighter and where much less maize is cultivated, the reverse is true, and only the late sown crops promise any return. Again the rainfall has been unusually local, and whereas one farmer reports an average prospect, others near by anticipate very small returns. Many crops that shew satisfactory growth in leaf and stem prove, on closer examination, to have borne no cobs at all, or where cobs were formed to have matured but little grain, owing to the unfavourable conditions obtaining at the important period of pollination.

The climatic conditions for all crops up to the beginning of February were ideal in Mashonaland, though dry in Matabeleland. Thereafter a rainless spell in the height of the growing season very adversely affected the prospects. The very full and illuminating replies that were received in gratifying response to a special enquiry, which was addressed to a number of maize growers, have materially assisted the preparation of this forecast. From information received, it would appear that there has been a complete failure of the maize crop in many parts of Matabeleland, and a considerable reduction in many parts of the maize belt proper; and it is practically certain that large patches of maize originally sown for grain will be cut green for ensilage, or be converted into dry maize fodder.

The acreage under maize in the 1913-1914 season was 161,268 acres: in 1914-1915 it was 167,012 acres, shewing an

increase of 5,744 acres, or 3.56 per cent.; and in 1915-1916 the area under maize returned by farmers, and shewn in the accompanying table, has reached 183,423 acres, an increase of 16,411 acres, or no less than 9.82 per cent. over the previous season. The average for the whole of Rhodesia for last year was 5.47 bags per acre, so that had the weather conditions been the same, we might have anticipated harvesting over 1,000,000 bags of maize, against 914,926 bags last year. In considering the probable crop at the coming harvest, we must remember that although in some districts the crop is virtually an entire failure, and elsewhere very limited, yet the prospects of a fair crop are good in several of the chief maize districts, such as Mazoe, Lomagundi, and in the neighbourhood of Makwiro, in the Hartley district. Moreover, it is precisely in these areas, where the average yield is always much higher than elsewhere, that the increased acreage under crop this year is most marked. For example, we find that in the Mazoe district, where the average harvest last year was over 9 bags per acre, there has been an addition of 5,385 acres; in Salisbury, with an average last year of 6.79 bags, there is an increase of 1,832 acres; and Lomagundi, with an average last year of 5.25 bags, shews an increase of 1,213 acres. Throughout the whole of Mashonaland, where the average yield last season was 6.21 bags, we have 13,428 acres more under maize. It would, therefore, seem that from these districts, where many, although not all, farmers report the likelihood of a reasonable crop, we may yet anticipate a considerable output of maize. Taking the acreage of each district into consideration, and allowing for the crop being reduced in accordance with local reports, we feel justified in estimating that the forthcoming maize harvest should yield somewhere between 620,000 and 680,000 bags of grain; and probably 650,000 bags will not be far from the actual result.

Turning now to the question of consumption and export, we find that out of the total crop last year of 914,926 bags we exported 352,058 bags of maize, leaving 562,868 bags for local consumption and the carry over. Last year, however, we imported maize, in addition, to the extent of 16,739 bags: and allowing for a further correction that must be made by the subtraction of 5,576 bags, representing the balance on the credit side between the exports and imports of maize meal, ex

pressed in terms of maize, the figure for local consumption must be increased by 11,163 bags. We thus find that last year our net consumption and carry over amounted to 574,031 bags. As the prospects of the maize crop in adjacent territories are at least not better than our own, we cannot look to them to affect our markets very much in the coming season.

It would thus appear that the prospect is that from a crop of about 650,000 bags our local consumption, based on last year's experience, will be about 575,000 bags, leaving a surplus of only 75,000 bags. Seeing, however, that our own requirements are likely to be larger than last year, owing to the anticipated scarcity of grain amongst the natives, it is highly probable that this estimated surplus of 75,000 bags will be entirely swallowed up by the requirements of our native population. In these circumstances it does not appear likely that we shall have any maize to send oversea next year.

It was the experience of tobacco growers last year that the season for that crop was not very favourable; and it would seem that this year again, if in different ways, the weather has not been very propitious, and that the average yield of last year (which was itself a low one, amounting only to half a normal crop) is not likely to be exceeded.

It will be remembered that the new arrangements with regard to the commercial aspect of this crop, with which all interested in tobacco are conversant, were formulated too late to affect this planting season to any extent; hence the altered conditions are not reflected in the acreage planted, which is practically the same as it was last year, viz., 1,369½ acres in 1914 and 1,333¼ acres this season. The total tobacco harvested last year amounted to 426,423 lbs., and the prospects are, therefore, that this season's crop is likely to be much the same, or between 400,000 and 460,000 lbs., say, 425,000 lbs.; though there is reason to expect that the quality of the leaf will be better than last year. In this connection, it may be permissible here to say that there is every reason to anticipate a large extension of the land devoted to this crop next year and in the future, with eventually an approximation to the scale of 1913-1914, when over 3,000,000 lbs. of tobacco were reaped.

CROPS.

District.	Area under Cultivation, 1915-16.		
	Total Area under Cultivation. Acres.	Area under Maize. Acres.	Area under Tobacco. Acres.
Salisbury	42,044	34,242	239
Mazoe	50,801	45,534	6
Lomagundi	15,532	13,642	64
Darwin, Mrewa and Mtoko ...	2,081	1,430	150
Hartley	26,475	21,132	111
Marandellas	9,220	6,222	574
Umtali	5,615	4,414	...
Melsetter	3,008	1,637	40
Makoni	7,353	5,239	114
Inyanga	678	293	2
Charter	4,621	3,588	9
Chilimanzi	4,063	2,878	3½
Victoria	4,142	3,414	1¼
Gutu, Ndanga and Chibi ...	2,276	1,786	10
Total for Mashonaland ...	177,909	145,451	1,323¾
Bulawayo	2,372	2,077	...
Umzingwane	3,614	2,906	...
Matobo	1,789	1,166	...
Bulalima-Mangwe	4,928	3,898	3
Nyamandhlovu	4,991	3,856	...
Bubi	4,577	3,916	...
Insiza	6,847	5,499	6½
Gwelo	13,092	10,494	...
Selukwe	2,466	2,190	...
Belingwe	488	453	...
Gwanda	850	497	...
Wankie and Sebungwe ...	1,831	1,020	...
Total for Matabeleland ...	47,845	37,972	9½
Grand Total for Southern Rhodesia	225,754	183,423	1,333¼

Dehorning of Cattle in Rhodesia.

By W. S. Wood, Shangani.

I have now spent four years in Rhodesia, and my ideas on the advantages of dehorning cattle are the same as when I entered the country.

One cannot help but be impressed with the enormous size of the horns of the majority of the cattle (more especially trek oxen), and to a layman it must be apparent that the vitality of a beast is impaired in the production of horns, and had these horns been destroyed when the animal was young, the substance would have been used in producing bone and muscle, which are the chief factors in the early stage of life.

I am convinced, if dehorning was once instituted by farmers and ranchers, it would soon prove a success and become an established practice for all cattle to be dehorned. I understand that in the Argentine, Texas and other large cattle countries, dehorning has reached such a stage that butchers will not look at a beast unless it is dehorned.

Dehorning is a very simple process, especially if done when the calf is a week old. There are two methods in vogue. One is to take a stick of caustic and rub around the horn. The other (which I much prefer) is to use a sharp knife. Get a good hold of the calf and cut well into the root of the horn, and lift it clean out; very little blood is lost during such an operation.

Large ranches will probably find it impossible to dehorn all their calves when a week old, but it can be done when opportunity offers, and if the calf is from 6 to 12 months old, it is very simple to dehorn either with the patent dehorners or a short rough tooth saw, and always cut close into the skull of an animal.

The best time to dehorn fully-grown cattle is in the winter months, when there are few flies about. Personally I do not recommend putting anything on the wound, but when flies are troublesome, a little Stockholm tar could be applied.

The advantage of dehorning, in addition to those already mentioned, is most apparent when rounding up a herd of cattle for branding, dipping or picking out a number for market. The horned cattle, especially the weak ones, are invariably torn, whereas dehorned cattle cannot disfigure each other.

Now that the Johannesburg market has been opened to parts of Rhodesia, I strongly advise all breeders of fat stock to dehorn their cattle, as a truck load of dehorned bullocks always looks better after a train journey than horned cattle, which are ruthlessly disfigured as the result of fighting, etc., and the value is correspondingly decreased.

Buyers will undoubtedly pay £1 per head more for dehorned cattle than for horned cattle of the same weight.

Oranges for the Troops Fund.

It will be recollected that last year a committee was appointed to deal with the gifts of oranges from Rhodesia for the troops. A brief notice appeared in the October issue of this *Journal* giving details of what had occurred up to that date. The final accounts in connection with disbursements in London have only recently been received, and now enable a statement regarding the financial position of this fund to be published, together with full particulars. It has been decided by the committee that the balance in hand of £17 1s. 7d. shall be handed over as a donation to the British Women's Hospital Fund.

The total number of cases of fruit despatched from Rhodesia was 145, approximately 6 tons. Of this amount, 76 cases were actually delivered in England for our troops, the balance of 69 cases being distributed to our troops in Capetown, as explained below.

Regarding the consignments from Marandellas, this fruit went forward in good firm sound condition, being picked at the proper stage for oversea shipment, while those from Umtali and Mazoe were inclined to be on the ripe side, hence the rejection at Capetown of the Umtali lot for shipment oversea, necessitating the distribution to troops on the point of embarking at Capetown for the European front. The Mazoe lot passing the Inspector at Capetown arrived in England, and was distributed to the troops, as intended.

As to the fruit sent in locally from round Salisbury and district, as donations in kind to the fund, I think it was a decided mistake even attempting to pack such irregular fruit. I say irregular with a purpose, and in doing so mean to imply that it is practically impossible to handle oranges for shipment to Europe unless the utmost care is taken in every detail of picking and packing. Oranges and lemons for export over-

sea must be handled with almost as much care as an egg, if we intend to build up a name for our fruit on the European markets, and there is no reason why we cannot. For my part I am satisfied that in the course of a few years, when our now young orchards, which are being largely extended, begin to produce full crops, we shall have made as good a name for Rhodesian oranges as is already the case with our neighbours in the south. But attention to details in culture and business methods in every operation connected with the industry must be our motto. The same difficulties that we have now to contend with, principally lack of proper transport facilities and appliances for the correct grading and sizing of the fruit, have been overcome by Union growers, who are now reaping the benefits.

The donations of fruit sent in from Salisbury district had perforce to be sent to Mazoe, by road, after taking two weeks to assemble enough in Salisbury to make up a quantity sufficient to be carried at the reduced rail and sea freights. The reason for this fruit having to be sent to Mazoe was that no apparatus was obtainable in Salisbury for sizing and packing. Through the courtesy of the B.S.A. Company, Estates Department, we were enabled to get this done at their Mazoe estate. Unfortunately their machinery, which had been on order for some considerable time, was detained somewhere on the road between the Transvaal and here. This meant a still further delay of some days. It was quite realised that the fruit was in most cases unfit for carrying to Europe to begin with, but it was felt that considerable disappointment would be experienced by the donors if no attempt had been made to deal with it. So that only two consignments were actually delivered to the troops in Europe—that from Marandellas Estate, a donation from the B.S.A. Company's Estates, and that from Mazoe, purchased by the committee with money donated to the fund. The lot from Umtali, partly donated in kind by local growers and partly a donation from the B.S.A. Company's Estates, was distributed to the troops then leaving for Europe at Capetown, as no cold store accommodation was available on the boats sailing, and it was considered inadvisable to attempt shipping in ventilated hold with fruit already two weeks in transit, while the Salisbury donation was given

to the troops at Capetown then awaiting embarkation to Europe.

In view of the impossibility of obtaining cold storage accommodation—this all being taken up with meat for troops at the European front—and being considered inadvisable to use ventilated hold, it was decided not to ship any further consignments. It is to be regretted that it was found impossible to send any further fruit, as during September, when things had to some extent righted themselves as regards boat accommodation, shipments were sent to London from Rhodesia, which arrived in excellent condition, and sold very well.

Our thanks are due to the donors of fruit and money, and also to the B.S.A. Company, Estates Department, for kindly allowing the sizing, grading and packing of all the fruit to be done by their employees, and also for supplying all boxes.

STATEMENT OF EXPENDITURE AND RECEIPTS IN CONNECTION WITH ORANGES FOR THE TROOPS FUND.

By Donations :—	£	s.	d.
H. L. Lezard	5	0	0
E. W. S. Montagu	5	0	0
C. Luxat	5	5	0
J. Robertson	1	0	0
C. D. Wise	2	2	0
G. N. Fleming	2	2	0
Colonel Grey	5	0	0
Chamber of Mines	20	0	0
Colonel Edwards	5	0	0
	£50	9	0

To Disbursements :—	£	s.	d.
Railage on 4 cases fruit, Gatooma to Salisbury	0	1	6
Railage expenses, Marandellas to Capetown	1	10	0
London office disbursement on two consignments	3	6	7
Purchase of 42 cases of oranges, Mazoe Estate	25	0	0
Railage, Mazoe to Capetown, on 42 cases	1	6	8
Capetown office shipping charges on 33 and 42 boxes oranges *ex* Kenilworth Castle and Saxon	1	6	11
Railage, Mazoe to Capetown, on 26 cases oranges	0	15	9
	33	7	5
By balance, cash in hand	17	1	7
	£50	9	0

By Donations in Oranges and Lemons:—

B.S.A. Co., Estates Dept.,	Salisbury.	F. G. Champion,	Gatooma.
Rhodesia Lands	,,	— Harris,	Umvuma.
J. Robertson	,,	R. G. Garvin,	Mazoe.
E. W. S. Montagu	,,	J. Meikle,	Umtali.
Caldecott & Tebbitt	,,	A. Strickland,	Umtali.
J. McChlery	,,	C. Eickhoff	,,
— Carrol	,,	— Bennet	,,
R. H. Everett	,,	— Lovat	,,

A. G. Turner,
Government Citrus Adviser,
and Hon. Sec., Oranges for the Troops Fund.

Poultry in Rhodesia.

By Frank Sheppard.

With reference to my remarks on early hatching in the February issue of the *Agricultural Journal*, I have recently received more than one communication on this subject, chiefly regarding hatching in December, January and February from the previous season's early hatched youngsters. Hatching at this time of year is only advisable if it is intended to supply the market with spring chickens for table purposes, but it is useless if the idea is to produce eggs when prices are high. Chicks hatched during these months will reach a marketable age when good table birds are scarce, and will moult, as do the adult stock, the following January or thereabouts. They will come on to lay in July or August, when the adult birds are in full lay and eggs are at a low price, and will therefore only lay for a very short period before commencing the moult at the end of the year.

In the construction of poultry houses, we often find that too little attention is given to the perches, which is one of the most important items. As a bird spends half its life on the perch, these should be made as comfortable as possible. It is a great mistake, especially when heavy breeds are housed, to fix the perches too high above the ground. For breeds such as Cochins, Brahmas, Langshans, etc., 1 foot high is usually enough, and 1½ feet to 2 feet is quite high enough for light breeds. When sand fleas are troublesome, there is always a desire to place the perches as high as possible, but they should never be placed more than 2 feet high. Straight native timber, 2 inches or 3 inches in diameter, with the irregularities removed and the top side slightly flattened, will make suitable perches, but they must not be 3 inches diameter at one end and 1 inch at the other, as we sometimes see. The perches should

be 1 foot apart, and the back one 1½ feet from the back of the house, so that there will be no fear of damaging the cock's tail. If the house is open-fronted, the front perch should be 2 feet from the front of the house. All the perches must be on the same level, as if they are one above the other towards the back of the house, the birds will crowd on to the highest one. Perches may be slung on wires, or fitted into sockets on the wall of the house, or fixed in various other ways, but whichever way is used, they must be securely fixed, and at the same time easily removed.

From time to time the ends of the perches should receive a dressing of paraffin, which will help to keep down insects, and they should be thoroughly cleaned and overhauled when the whole of the plant receives its annual "spring cleaning," or "autumn cleaning," as it is in the poultry world. Although a certain amount of cleaning and disinfecting is carried out when the hatching and rearing season is finished, and all incubators, brooders and small chick houses are stored away for future use, now is the time for the great annual cleaning of all the plant. All houses and runs which have been rested during the wet season should now be thoroughly overhauled. Houses possessing earth or dagga floors should have the top surface soil removed and fresh clean earth supplied. Incubators must be thoroughly washed out and tuned up ready for use, and brooders and small chick houses must be disinfected and attended to, in readiness for the hatching season, if it has not already commenced.

As the various agricultural show societies are already well ahead with the work in connection with this year's shows, the intending exhibitor must consider when and what he will exhibit, and must not leave his selection till the last moment. The poultry sections of our agricultural shows are usually excellently well managed, considering the conditions under which so many of them are held, and every credit is due to those responsible for the care of the birds during the period of the show, but in one or two instances we have noticed points which should receive the attention of the committee in future years. The appointing of stewards who are poultry keepers and know how to handle a bird, and who are not themselves exhibitors, is often a difficulty when the number of white

assistants is so small. When the appointed stewards are themselves exhibitors also, they should be instructed not to pen any birds in classes in which they are exhibiting, and above all things they should of course not pen their own birds. The prompt posting of the award cards is another important point towards good management, specially in one-day shows. The judge's slips should not be retained by his steward till the judging of all the classes is completed, before handing them in to the secretary. The slips should be handed in as each class is judged, or at the most each two or three classes, and the award cards filled in and posted on the pens promptly. Cards for special prizes will, of course, usually be left till all the judging is completed. If all the slips are held over till the judging is completed before being handed in to the secretaries' tent, it will probably be early in the afternoon before the cards are posted on the pens, if the judging has not been completed till almost lunch time. This always causes much disappointment to visitors and exhibitors, who are continually visiting the pens during the morning to learn the fate of the birds. I need hardly add that the prompt payment of all prize money, and the awarding of prizes and specials strictly in accordance with the schedule, are also most important points to be carried out.

I am thankful to say I have not yet noticed any show committees resorting to the bad practice of cancelling or amalgamating classes at the last moment, and not advising exhibitors. This and the withholding of prize money and specials will always affect the popularity of a show from an exhibitor's point of view.

Agricultural societies in Rhodesia are not faced with the problem of endeavouring by various ways and means to increase the popularity of the poultry section of the shows, as is often the case with many small societies struggling for an existence in England and elsewhere. One invariably finds the poultry section well supported, and usually it is one of the chief features of the show.

When proper show pens are not obtainable, there is always a difficulty in penning the birds satisfactorily, but I have found the authorities have always made the best possible use

of the material at their disposal, except in one or two instances where the turkeys have been rather badly treated. The careful handling of the birds while penning and unpenning is a matter to which the stewards should give attention. On being removed from its travelling crate, the bird should be held firmly with both hands round the body, the wings held close to the sides, and placed in the pen head first. The hands should not be withdrawn till the bird is right inside the pen. To remove the bird, the body and legs should be held firmly by both hands, the wings close to the sides. As the bird is drawn towards the door, head first, the front should be lowered, which will, of course, raise the tail, and will bring the legs off the floor, and the bird may be easily withdrawn without undue fluttering or damaging of feathers.

In the April issue of the *Agricultural Journal* last year I gave a few hints on the preparation of birds for exhibition. I had intended in this article to give a short list of the show points of the most popular varieties exhibited in Rhodesia, but I now find this must be left over to some future date, and will confine my remarks to the serious defects which are to be looked for, and, if possible, avoided in exhibition birds. A bird possessing a serious defect need not necessarily be passed by the judge, but it probably will. First let the difference between "serious defects" and "disqualifications" be understood. Such points as lead to a bird being excluded from competition, and which do not imply any fraud or fraudulent practices, such as roach back, wry tail, deformed beak, etc., are termed serious defects. Fraudulent practices, such as removal of feathers, cutting of comb, lobes or wattles, staining of legs, face or plumage, will disqualify a bird, and the word "disqualified" will be written by the judge on a card on the pen. A bird shewn as a cockerel or pullet, when there are good reasons for its being considered over age, will also be disqualified. It is the serious defects—not disqualifications—that I will deal with. Let us take as an instance the defects to look for and avoid in Rhode Island Reds: Feather or down on shanks or feet, or unmistakable indications of a feather having been plucked from same; badly lopped combs; side sprigs or sprigs on single combs; more or less than four toes on either foot; entire absence of main tail feathers;

two absolutely white eyes; wry or squirrel tail; a feather entirely white which shews in outer plumage; an ear lobe shewing more than one half the surface white; diseased birds; crooked backs; deformed beaks and shanks, and feet other than yellow or red-horn colour. In White Wyandottes, as serious defects we regard:—Comb other than rose, or falling over on one side, or so large as to obstruct the sight; beak deformed; ear lobe covered more than one-third of its surface with permanent white or yellow; back crooked; tail wry or squirrel; legs feathered on shanks or toes and other than yellow in colour, except in adult birds, which shade to light straw colour; feathers other than white in colour. The serious defects in all varieties are, of course, not identically the same, but these two instances will give exhibitors some idea what to look for and avoid in other varieties.

In selecting birds to exhibit as a breeding pen, the exhibitor must realise that the birds will be judged as a pen—not individually. He must select birds of the same type that when mated up would form a pen for breeding for some definite object. For instance, in exhibiting a pen of White Leghorns, do not mate two pullets, one of English exhibition type, the other of American utility type, to a South African utility cockerel; or again, do not mate a Silver Wyandotte cockerel to two pullets, one a pullet breeder, the other a cockerel breeder. If, when selecting your breeding pen of Rhode Island Reds, the hens are rather light in colour, choose a dark but even coloured cockerel, as it is the uneven coloured cockerels which tend to throw light coloured chicks. Above all, never mate male and females possessing similar faults.

The Agricultural Outlook.

The general outlook for the present season cannot be described as rosy. The February-March drought has hit the country hard in respect to both arable and pastoral farming, although the rains which fell during the third week of March have somewhat improved the position as regards stock.

With the exception of the Wankie district, where the cattle are said to be poor, reports are to the effect that stock, large and small, are healthy and in excellent condition, with practically no losses from sickness, except a few calves and one or two cases of redwater. Up to the middle of March grazing generally was quite good, but in most districts the prospects for winter were considered gloomy—herbage withering, grass in places already dead or dying and in isolated patches burnt off. Rivers were low, wet-season spruits dry, water-holes shrinking, and in some districts stock-owners were beginning to make enquiries for facilities to move their cattle to better veld. It seems likely, however, that now the late rains above referred to will fill the rivers, freshen the grass and generally ease the position as regards winter feeding.

The effect of the drought on crops has been universally severe, though some districts have suffered less than others, the favoured spots being Marandellas, Makwiro and parts of Mazoe. Marandellas crops are spoken of as good on the whole. Makwiro will reap well on black soils, and where plantings were early. Mazoe prospects vary from good heavy crops to some below 50 per cent., apparently as a result of the irregular incidence of the rains. Lomagundi has also some farms on which fair average yields are expected. In many parts of Matabeleland, and on much of the sand veld, crops are reported to be complete failures. It is quite possible that some of the best looking crops have been over-estimated, owing to the fact that numerous healthy maize plants carry no cobs at all, and in fields that appear promising, the cobs will be found

to be small and light. It is doubtful if the local production of grain will exceed local demands for consumption, especially in view of the fact that the loss of native crops has been much more complete than of European, and large supplies will, therefore, be required for sale to natives.

Several points of instructive importance emerge from a study of this season of trial. The failure of natives to raise crops of maize where Europeans have succeeded, demonstrates the value of enlightened methods, particularly in the direction of systematic cleaning and cultivation. On the other hand, a most significant fact is that where native plantings of maize have quite failed, crops of indigenous grain have at least partially succeeded—for instance, inyouti, rapoko and kafir corn. This seems to shew that, as a reliable stand-by for stock feeding, more attention should be paid to these native grains, which yield results on soils that are unsuitable, and in seasons that are fatal to maize. Further, the fact that early plantings have everywhere scored over late, again emphasises the necessity for organising farm work so that early planting may be secured. The reports also shew the immense value of black, bottom lands in the mealie belt, for on these good crops are standing when adjacent red land, under identical treatment, has suffered heavily. Another useful pointer for the arable farmer is to note that ground-nuts appear to have withstood drought better than grain crops.

Veterinary Report.

January, 1916.

AFRICAN COAST FEVER.

Salisbury District.—No fresh outbreaks. The following deaths occurred at existing centres of infection:—Borrowdale, 8; Glen Lorne, 1; Sternblick, 6.

Mazoe District.—One case occurred in a herd on the infected veld near the Mazoe dipping tank.

Melsetter District.—No fresh outbreaks. The following mortality occurred at existing centres of infection:—Roslyn, 9 head; Joppa, 1; Inhoek, 6; Wolvedraai, 1; Ravenswood, 1; Cecilton, 1; Ostend, 1; Rookwood, 10.

TRYPANOSOMIASIS.

A serious outbreak of trypanosomiasis occurred amongst pigs on two farms on the Umfuli River, near Hartley township, under conditions which appear to point to infection by vectors other than the tsetse fly. Preliminary experiments with this form of the disease have been undertaken, and arrangements have been made for the regular immersion of the remaining pigs in an arsenical solution.

CALF DISEASES.

A heavy mortality occurred amongst calves on a farm in the Umtali district. The symptoms exhibited were high temperatures and a fetid diarrhœa. The disease seemed to be

confined to calves under three months old. *Post-mortem* examination shewed enormously enlarged spleen and liver, the latter shewing chronic venous congestion, the small intestine extensively inflamed. Microscopic examination shewed an infection with bi-polar staining organisms of the fowl cholera type. Piroplasmosis was suspected, but no parasites could be found in the preparations submitted. Treatment with purgatives and internal antiseptics was tried without any success. It was decided to temperature the remaining calves, 16 in number, when it was found that all had high temperatures. These were treated with trypan blue, and temperatures taken daily. On the fourth day nearly all were normal, and the general condition had improved; two succumbed, one within 24 hours of the injection and the other after two days.

In the Que Que district a heavy mortality occurred amongst the calves on several farms, but so far the fatalities do not appear to be so numerous as last season, when it is stated many farmers lost 80 per cent. of the calves. The Assistant Chief Veterinary Surgeon visited the district, and states in his report that he saw or heard nothing during his investigation to lead him to think that the mortality was any different from or more severe than had been experienced in the past in other centres in Rhodesia, where experience has proved the tick to be the primary cause. Preparations in these cases did not shew any organisms of a similar nature to those described in the Umtali cases.

MALLEIN TEST.

The following animals were tested on importation, with negative results:—Horses, 3; mules, 11; donkeys, 31.

IMPORTATIONS.

In addition to the above, the following animals were imported:—Heifers, 204; bulls, 10; sheep and goats, 1,953; pigs, 40.

February, 1916.

AFRICAN COAST FEVER.

Salisbury District.—No fresh outbreaks. The following mortality occurred at existing centres of infection:—Borrowdale, 1; Greystone, 1; Glen Lorne, 5; Sternblick, 2.

Mazoe District.—One case occurred in a herd not previously infected, but running on the infected veld near the dipping tank.

Melsetter District.—Fresh outbreaks occurred during the month on the farms Lombard's Rust and Moosgwe. The former adjoins the infected farms Quagga's Hoek and Ostend, and the appearance of the disease thereon was not surprising. The latter farm, however, is a considerable distance from the nearest known centres of infection, and lies within a section which, by the mountainous nature of the country, is almost completely isolated from them. The nature of the outbreak is somewhat unusual, as twelve head died within a few days, since when there have not been any suspicious cases. I am rather inclined to think that the original outbreak in the northern section of the district was caused by a movement of cattle from the southern section, and that an infected animal was in this lot, and left a trail of infection with which Moosgwe cattle came in contact. The mortality for the month is as follows:—Roslyn, 10; Inhoek, 12; Wolvedraai, 3; Ravenswood, 2; Ostend, 4; Rookwood, 9; Lombard's Rust, 12; Moosgwe, 12.

CONTAGIOUS ABORTION.

One case of this disease was discovered on a farm in the Marandellas district.

SKIN DISEASE IN CATTLE.

An undetermined skin disease amongst cattle on a farm in the Wankie district was investigated by the Assistant Chief

Veterinary Surgeon, and investigations are being carried out at the Veterinary Laboratory in connection with same. The bont tick (*Amblyomma variegatum*) exists in that area, and it is not unlikely that it is the cause of the trouble.

MALLEIN TEST.

The following animals were tested on importation, with negative results:—Horses, 8; mules, 17; donkeys, 9.

IMPORTATIONS.

In addition to the above, the following animals were imported:—Bulls, 2; heifers, 61; sheep and goats, 3,152.

J. M. SINCLAIR,
Chief Veterinary Surgeon.

Farming Calendar.

April.

BEE-KEEPING.

Where numbers of the bee-louse are seen attaching themselves to the legs of bees and also among the quilts which cover the frames, this pest can be controlled by crushing them with the finger. In the cooler districts, crates that are partially filled with honey should be removed, and into the lift which they occupied plenty of warm clothing should be snugly packed.

CITRUS FRUITS.

During the early part of this month autumn budding can still be performed if sap is still up; in fact, if the season is late this operation is better done a little late than early, as in the event of late rains occurring followed by a warm spell, the buds are liable to start growing, but are soon checked, the result of which is usually a stunted tree. Water by irrigation should be supplied to bearing orchards, unless unusual soaking rains have fallen late in season, followed by thorough cultivation and hoeing around trees. Continual watch must still be maintained for fruit-eating and codling moths. Spraying or fumigating against insect or other pests should not be neglected. Some early varieties may be expected to be ripening towards the end of this month.

CROPS.

The rains are practically over by this month, and the harvesting of early crops, such as buckwheat, linseed, teff grass and manna, will commence. The silo pit should be got ready, and the making of ensilage should be undertaken during this month. Napier's fodder can now be cut for this purpose. Veld hay for feeding should not be cut later than the end of this month. All lands that are available should be ploughed. The preparation of vleis for winter crops should be continued, and late crops, such as Algerian oats, should be sown this month; also barley for an early green crop.

DECIDUOUS FRUITS.

Orders should be given to the nurseryman for trees required in August, September or October. Trees will be lifted in August, and may with advantage be kept in cool storage till required.

ENTOMOLOGICAL.

Maize.—"Earworms" are sometimes troublesome in the tassels and ends of the cobs, but this pest cannot be directly attacked. Caterpillars may attack the crop, on account of their food being suddenly destroyed by late cultivation after the weeds have been allowed to get too far ahead.

Tobacco.—Any remaining plants shewing stem borer attack should be removed and burnt.

Potatoes.—Should be systematically cultivated and hilled, to keep tuber moth from tubers.

Cabbage Family.—Plants of this family are liable to suffer severely from cabbage louse and Bagrada bug.

Beans and Cowpeas.—Insect attack on these plants is but little obvious during April.

Dahl.—Suffers much from blister beetles destroying the blossom during April. Hand picking is the only remedy.

Citrus Trees.—Collect and destroy infested fruit, to keep down citrus codling.

FLOWER GARDEN.

Sow sweet peas. Hardy annuals, such as candytuft, cornflower, eschscholtzia, gypsophillia, larkspur, mignonette, poppy, etc., may be sown in the open ground, and should not be transplanted. Perennials may be sown in boxes.

FORESTRY.

Prick out into tins the young trees raised from the seed sown in February. Any breaking up left over from last month should be completed this month; also any fire lines left unploughed.

POULTRY.

Adult stock should have completed the moult by now, and may be put on a laying ration. Breeding pens should be mated up. If pullets are used in the pens they should be mated with a two-year-old male bird. Any birds which have not completed the moult should not be used in the pens. Do not breed from all and sundry. Carefully select your breeding stock, and handle each bird. Discard all with crooked breast-bones, wry-tails, in-knees, crooked toes or other serious defects. Select as many as possible that have already started to lay. Remember the male bird is more than half the pen. Above all, do not give your breeding birds a forcing laying food; it is not the quantity of eggs you should look for, but the quality. Spring hatched birds from Australia may now be imported.

STOCK.

Cattle.—Cattle on the ranch should require little attention beyond dipping. Bulls should be kept out of the herd if January calves are not desired. Dairy cattle will require a ration of crushed or ground maize and some succulent food, such as green maize stalks, Napier's fodder or ensilage, if any of the latter has been left over from last year. Calves should be supplied with green fodder and a ration of maize meal, together with some more nitrogenous food, such as bean meal, pea meal, buckwheat meal, or linseed meal. Care should be taken to provide supplementary food to all cattle before they lose any appreciable amount of flesh, in order that mid-winter may not find them in poor condition. All preparations for making ensilage should be completed by the beginning of the month. Any haymaking still undone should be attended to without delay, weather permitting. Attention should be given to water supplies for winter, and arrangements made to prevent water holes, etc., being trodden in as the supply shortens.

Sheep.—If grass seeds are troublesome, an area should be mown for grazing. Sheep should not be allowed to graze in the vleis. If the ram is put in now, lambs will be born in September, which may be considered somewhat early by some breeders.

TOBACCO.

Tobacco curing should be completed this month.

VEGETABLE GARDEN.

Potatoes require ridging and tomatoes staking and tying up. Potatoes which mature after the rains may generally remain in the soil and be lifted as required. Vegetables planted out for winter crops should be well and continuously cultivated, which will bring them along quicker, with less watering. Beans and peas should be staked and tied. Beans, carrots, cabbage, cauliflower, peas, turnip, spinach, beet and radish should be sown for late winter crops.

VETERINARY

Horse-sickness will be prevalent this month, as will blue tongue in sheep. The first symptom is laminitis, the second a protruding blue tongue.

WEATHER.

Along the higher ridges of the country we may still look for an inch of rain, more or less, during the month, though little, if any, can be expected in the Zambesi and Limpopo valleys and all low-lying parts of the country. As often as not, however, April is a dry month. In past years it has occasionally happened that early frosts have been recorded which put an end to the tobacco harvest, and may kill tender vegetables and flowers; but, as a rule, no such calamity need yet be expected, and if at all, only in frosty hollows.

May.

BEE-KEEPING.

The scarce supply of nectar, due to conditions of drought, will be responsible for a deficiency of stores. Where this is noticed, steps must at once be taken to supply the bees with artificial food in the shape of syrup. A feeder must be placed above the frames inside the hive. Never feed bees outside, as it promotes robbing.

CITRUS FRUITS.

Continue irrigating bearing orchards up to within three weeks of picking fruit, followed by cultivation and hand hoeing. The same remarks as in April apply concerning insect pests, etc. Washington Navel oranges will be ripening this month, and possibly some early ripening seedlings.

CROPS.

Crops such as summer wheat will be ready for harvesting. Majorda poolongs should be carted to some convenient spot, but not heaped. Ploughing should be continued on all available lands. Winter crops in vleis, such as Early Gluyas and other wheats, New Zealand oats and barley, should all be sown not later than this month. Napier's fodder may still be cut for ensilage during this month. This will give time for a considerable after growth, which can serve as winter pasture.

ENTOMOLOGICAL.

Cabbage Family.—Plants of this family are liable to suffer greatly from cabbage louse and Bagrada bug during May. For the former, spray with soap and tobacco wash, which must help if the plants are not too big

Dahl.—Blister beetles are still injurious to the blossom of the crop, and should be regularly collected and destroyed.

Citrus Trees.—Continue to collect and destroy all fruits infested with citrus codling.

Guava.—Fruit fly and citrus codling breed in these fruits during the autumn and winter.

FLOWER GARDEN.

Sow *in situ* cornflower, larkspur, mignonette, poppy; sweet peas may also be planted.

FORESTRY.

Complete pricking out into tins. Strike cuttings of species that are propagated in this manner, such as poplars. If it is intended to use the saltpetre method of eradicating stumps, the trees should be felled this month.

POULTRY.

If the means of incubation is limited, hatch the heavy breeds first, as they take longer to mature. Hatch as early as possible, to get your birds well grown before the rains, as they will make very much better development during the dry months. Do not breed from turkeys till they are fully matured. Two-year-old hens and a three-year-old male bird will be found to give the most satisfactory results. Very heavy male birds should not be used. As is the case with fowls, in breeding for size, we get this from the hens, which should be large and possessing straight keels. Get the turkeys on to lay as soon as possible. Eight or nine-month-old birds are the best for market purposes.

STOCK.

Cattle.—Ranching cattle may still be expected to be in good condition. Dairy cattle should be treated much the same as is recommended for April, but the ration should be increased somewhat, especially the succulent portion. Grass may still be cut for bedding, and both cows and calves should be well bedded down at night from now onwards. Maize will probably be in fit state for making into ensilage, and towards the end of the month maize hay may be made after the removal of the cobs. The vines of monkey nuts when reaped should be carefully preserved for fodder. Cowsheds should be put in good repair against the cold winter nights.

Sheep.—The vleis having dried, sheep will probably do better in the lower lying lands. If the ram is put in now, lambs will be born in October, which is usually a good month to arrange for. Those who favour winter lambs, and have ewes lambing now, will find a few handfuls of maize a great help to the ewes in providing milk.

TOBACCO.

Tobacco will be sent to the warehouse this month. The work of preparing the land for the next crop should now be taken in hand. The stalks of the old crop should be taken out and burnt.

VEGETABLE GARDEN.

Sow broad beans, peas, lettuce, spinach, parsnips, carrots, radish and beet. Constant cultivation is necessary.

VETERINARY.

Horse-sickness will still be in evidence, and may be expected to continue until the frosts occur. Inoculation for blue tongue should be performed in the dry season only, unless the animals can be kept under cover for 21 days. Do not inoculate ewes in lamb on account of abortion. Inoculated animals spread the disease for 21 days. Scab is a poverty winter disease.

WEATHER.

The dry season should have now set in, though averages of from a quarter of an inch to three-quarters are indicated in the official reports. Ground frosts at night have been recorded, but are very unusual.

PHASES OF THE MOON.

April :

2nd	New Moon
10th	First Quarter
18th	Full Moon
24th	Last Quarter

May :

2nd	New Moon
10th	First Quarter
17th	Full Moon
24th	Last Quarter
31st	New Moon

June :

8th	First Quarter
15th	Full Moon
22nd	Last Quarter
30th	New Moon

Market Reports.

The most noticeable feature of the market has been a certain amount of speculative dealing in maize in anticipation of a small harvest. This inflated the price temporarily, but it soon reverted to a more moderate figure, from 10s. to 12s. 6d. The general shortage of grain was reflected in the price of rapoko, which has been as high as 27s. 6d. per bag. Onions have hardened from about 12s. to over 20s. per bag. Butter and eggs have also been in demand at better prices. In the general live stock market, there has been no great fluctuation, except that the price per 100 lbs. for slaughter cattle is even lower than two months ago.

Messrs. Boggie & Co. held an intermediate sale of cattle on Wednesday, 19th January. This firm conduct their regular stock sales every two months, but owing to the number of cattle which they had on hand, they found it necessary to hold a sale in January. Their own selling pens being under repair, the sale was conducted in Messrs. Pinches & Co.'s extensive yards. There were upwards of 2,000 head in and outside the yards, the bulk of which were slaughter stock. The attendance of butchers was not so good as usual, but this may be attributed to the fact that these men purchased very largely at the December sale. Breeding stock was, however, in fair demand, a fillip to the bidding being given by a visitor to Rhodesia, who considered that he saw a fair margin of profit by purchasing several head of cows with the object of leaving them in the country to increase. There was no demand for horses, mules or donkeys. Heifers fetched from £4 10s. to £6 15s., old cows averaged about £5, and trek oxen £6. A large number of slaughter stock was withdrawn, but one speculative buyer purchased several head with the intention of sending them to the Johannesburg market. Stock-owners in this district will keenly watch the result of the venture, as in the event of the speculation proving successful, it will at once

relieve the pressure, and prices should harden up all round. There were enquiries for second-hand wagons, but no sale for Cape carts. All fowls brought on the market realised 3s. 9d. each.

Messrs. Boggie & Co. held their regular two-monthly cattle sale on the 15th of March. Their large sale yards, which have recently undergone extensive alterations, were filled with nearly 2,000 head of cattle of all descriptions. The annual meeting of the Farmers' Union was held on the same day, and this was to some extent the cause of the buyers being more numerous than usual. A feature of the sale was the large number of cattle which had to be sold without reserve. These were mainly Mashona cattle. They entered the sale ring in batches of about a dozen at a time, and although the prices were rather lower than usual, there seemed to be quite a fair number of buyers. Slaughter stock, especially the heavy animals, were in keen demand for the Johannesburg market. The average price of Mashona heifers was from £3 10s. to £4; three-year-old oxen, £2 10s. to £3; trek oxen were not in much demand, the average price being about £5. The price of good slaughter animals was about 35s. per 100 lbs.

Article.	Johannesburg.	Kimberley.	Bulawayo.	Salisbury.
Barley, 150 lbs.	9/9 14/6	—	—	25/0
Beans, 203 lbs.	37/0 49/0	—	—	25/0 30/0
Boer Meal, unsifted, 200 lbs.	—	—	54/0 55/0	45/5 50/0
Bran, wheaten, 100 lbs.	6/10 7/0	—	12/0 13/0	15/0 16/0
Flour, 100 lbs.	—	—	—	26/0 27/0
,, Colonial, 100 lbs.	—	—	29/0 30/0	27/6 30/0
Forage, 100 lbs.	3/6 5/6	—	—	7/6
,, Colonial Oat	—	—	—	—
	Bale.		Ton.	
Hay	6d. 7d.	—	70/0 80/0	35/0 40/0
Kaffir Corn, 200 lbs.	9/0 11/6	11/9	17/6 19/6	—
Manna, 100 lbs.	—	—	—	—
Mealies, S.A. White, 203 lbs.	9/8 10/6	11/3 11/9	17/0 18/0	10/6 12/6
Mealies, Yellow, 203 lbs.	10/6 11/0	11/0 12/0	—	12/0 12/6
Mealie Meal, White, 183 lbs.	—	—	—	—
Munga, 200 lbs.	—	—	—	11/0 12/0
Monkey Nuts, bag, 83 lbs.	7/10	—	9/6 10/6	6/9 7/6
Oats, 150 lbs.	8/0 12/0	—	18/6 20/0	25/0 27/6
Onions, 120 lbs.	10/0 11/0	6/0 10/0	12/6 16/6	20/0 22/0
Peas, 200 lbs.	29/6	—	—	—
Potatoes, new, 150 lbs.	8/0 9/0	5/0 13/0	17/6 18/6	9/0 11/6
,, old, 150 lbs.	2/0 7/6	—	—	—
Rapoko	—	—	—	25/0
Rye, 200 lbs.	17/3	—	—	—
Salt, 200 lbs.	4/0	—	—	11/6 12/0
Wheat, 203 lbs.	23/0 30/0	—	—	30/0
Butter, local, per lb.	1/3 1/5	1/3 1/6	1/0 1/4	1/6 2/3
Eggs, local, per dozen	2/9 3/0	1/0 2/0	2/3 2/9	3/0 3/6
Ducks, each	2/1 3/0	2/0	3/0 4/0	4/6 6/0
Fowls, each	1/0 2/9	10d. 1/8	7d. 1/0	3/0 4/6
Geese, each	2/6 3/9	—	—	9/0 11/0
Turkeys, cocks, each	8/0 9/6	4/9 7/0	—	—

LIVE STOCK.

Slaughter Cattle, 100 lbs.	31/0 36/0	—	27/6 30/0	30/0 32/6
Trek Oxen, trained	£6/10 £8/10	—	£6 £8	£8 £10
Local Cows, milk	—	—	£6 £15	£5 £7/10
Dairy Cows	£5 £12	—	£20 £25	—
Native Cows	—	—	—	£5/0 £6/0
Heifers, Colonial	£5 £10	—	£5 £17	£7/10 £8/10
,, Native	—	—	—	£4 10 £5
Pigs, live weight	2½d. 4½d.	—	3½d. 4½d.	4½d. 5d.
Horses, riding, salted	—	—	—	£35
,, ,, unsalted	£6/10 £25	—	£12 £30	£20 £35
Mules, inoculated	£8 £23	—	£20 £30	£22 £25
Donkeys, geldings	—	—	£3/10 £6	£3/10 £5
,, mares	—	—	£5 £7/10	£6 £7
Goats	11/6 18/0	—	8/0 12/0	9/6 12/0
Persian Ewes	—	—	—	20/0 22/6
Cross-bred Ewes	—	—	—	20/0 22/6
Sheep, slaughter	8/6 23/0	—	15/0 24/0	27/6 30/0

Weather Bureau.

TEMPERATURES.

Station	January		February	
	Mean Max.	Mean Min.	Mean Max.	Mean Min.
MASHONALAND—				
Charter—				
Enkeldoorn	81·3	60·1	86·69	57·27
Hartley—				
Gatooma	86·7	64·2	92·55	63·79
Hallingbury Farm	81·6	61·7	87·5	58·1
Hartley Hospital	—	—	90·0	58·0
Idaho	81·0	59·6	88·5	57·12
Lomagundi—				
Clydesdale	—	—	—	—
Eldorado Mine	79·52	63·05	85·0	60·6
Kanyemba	91·4	72·7	98·1	71·8
Sinoia	85·4	62·7	89·58	63·79
Sipolilo	80·3	62·64	86·5	62·1
Makoni—				
River Junction Farm ...	—	—	—	—
Rupurara	78·8	58·6	74·67	53·51
Mangwendi—				
Kwenda Hospital	75·61	63·92	80·2	64·3
Mazoe—				
Melfort Farm Estate ...	—	—	—	—
Shamva Mine	84·84	65·56	89·56	64·56
Melsetter—				
Melsetter	77·1	53·1	71·0	52·4
Mount Selinda	75·3	61·2	80·5	60·4
Vermont	79·89	61·35	83·7	60·1
Salisbury—				
Chishawasha	79·3	60·6	86·1	57·5
Salisbury (Gaol)	80·5	60·1	87·3	59·4
Umtali—				
Chiconga's Location ...	83·2	63·2	88·3	61·3
Public School	83·67	62·47	89·62	61·78
Summerfield	75·6	44·3	—	—
Victoria—				
Eythorne	90·0	60·9	90·3	59·1
Morgenster	80·6	63·1	83·77	62·0
Victoria	81·38	61·87	85·38	58·51
MATABELELAND—				
Bulalima—				
Plumtree School	85·1	61·3	90·0	61·8
Tegwani	—	—	—	—
Bulawayo—				
Essexvale	83·3	62·2	88·62	59·62
Holly's Hope	88·38	63·84	92·76	62·73
Hope Fountain	82·49	61·37	88·2	58·8
Observatory	81·0	60·9	—	—
Rhodes Matopo Park ...	89·8	64·2	95·9	62·9
Gwanda—				
Antelope Mine	88·56	65·87	93·7	66·48

TEMPERATURES—*(Continued).*

Station	January		February	
	Mean Max.	Mean Min.	Mean Max.	Mean Min.
MATABELELAND—(Continued)				
Gwelo—				
Gwelo (Gaol)	81·1	56·4	88·5	53·96
Hagley (Iron Mine Hill) ...	—	—	—	—
Mangwe—				
Empandeni	89·2	62·2	89·3	61·3
Tuli—				
Mazunga	92·9	66·0	97·1	66·5
Tuli	93·9	68·3	98·1	69·2
Wankie—				
Guyo	—	—	—	—
Victoria Falls	—	—	93·0	56·0
Wankie (Hospital)	93·3	68·9	99·2	70·3

RAINFALL.

Station	January	February
MASHONALAND :		
Charter—		
Buhera	4·43	0·55
Bushy Park	8·17	0·98
Central Estates	10·56	0·86
Driefontein	5·95	0·19
Enkeldoorn	5·20	0·67
Grootfontein	5·63	0·46
Induna Farm	6·95	0·03
Marshbrook	8·25	Nil
Orton's Drift	8·30	—
Range	4·29	0·16
Riversdale	6·73	—
Spitzkop	6·08	1·35
Umniati	4·69	1·15
Umvuma (Railway)	8·73	—
Vrede	11·26	0·21
Wylde Grove	4·18	—
Hartley—		
Ardgowan	4·20	0·78
Auchter Leny	5·91	—
Battlefields (Railway)	6·27	0·60
Carnock Farm	4·72	2·05
Clifton Farm	8·21	Nil
Elephant Hill, Battlefields	7·71	1·68
Elvington	6·29	0·01
Gadzema (Railway)	10·59	1·22
Gatooma	6·68	2·21
Gatooma (Railway)	6·81	1·99
Gowerlands	7·83	0·07
Hallingbury	6·76	0·79
Hartley Hospital	13·96	0·62

RAINFALL—*(Continued).*

Station	January	February
MASHONALAND—(Continued)		
Hartley—continued		
Hartley (Railway)	8·71	0·55
"Jenkinstown"	7·46	0·39
Makwiro	11·11	0·33
Makwiro (Railway)	10·43	0·48
M'pofha Farm	11·15	—
Philiphaugh	9·77	0·72
Shagari	6·20	0·76
"Stoneygate"	7·88	1·22
Lomagundi—		
Argyle	14·99	1·84
Banket Junction (Railway)	10·31	1·66
Darwendale	8·88	1·01
Duxbury Farm	11·96	0·46
Eldorado (Railway)	11·78	2·33
Eldorado Mine	10·96	1·76
Golden Kopje Mine	12·93	1·28
Kanyemba	8·58	—
Lion's Den	10·59	—
Lone Cow Estate	8·60	1·72
Longmead	8·74	3·30
Palm Tree Farm	8·05	1·32
Sinoia	12·06	2·28
Sipolilo	6·86	1·91
Umvukwe Ranche	9·79	2·22
Makoni—		
Carlow Farm	8·00	0·22
Chimbi Source	3·54	1·31
Eagle's Nest	4·17	2·99
Ellavale	3·63	1·26
Gorubi Springs	6·26	0·54
Inyanga	5·05	0·75
Mona	2·88	0·39
Monte Cassino Mission	6·17	1·63
Odzi (Railway)	4·83	1·23
Rupurara	6·99	0·66
Rusape (Railway)	3·59	0·64
Springs	4·94	0·77
St. Trias' Hill	6·54	0·48
Mangwendi—		
Bonongwe...	5·61	1·34
Glen Somerset	9·26	0·69
Harlick	6·07	2·12
Huish Estate	6·46	1·94
Kwenda Hospital	6·36	0·07
Land Settlement Farm	8·49	0·32
Macheke (Railway)	3·35	1·72
Marandellas	8·63	1·40
Marandellas (Railway)	8·22	1·17
Mtoko	3·63	0·54
Mrewa	8·00	1·72
Nelson	5·07	0·23
Selous Nek	7·36	0·58
Theydon	5·28	1·03
Tweedjan	5·40	0·45

RAINFALL—(*Continued*).

Station	January	February
MASHONALAND—(Continued)		
Mazoe—		
Avonduur	8·47	2·06
Bindura	4·64	1·49
Bindura (Railway)	5·60	1·60
Ceres	7·38	1·81
Chipoli	4·46	1·29
Citrus Estate	7·66	—
Dunmaglas	9·53	1·78
Fairview	—	—
Jumbo (Railway)	11·24	0·55
Kilmuir	9·86	1·06
Laguaha	5·67	2·00
Lowdale	5·52	0·82
Mazoe	11·88	1·76
Mguta Valley	9·12	0·55
Mount Darwin	12·42	0·98
Omeath	8·54	1·23
Ruia	11·32	1·90
Ruoko Ranche	8·97	0·93
Shamva	6·49	0·72
,, Mine	4·98	0·89
Sleamish	—	—
Stanley Kop	10·81	0·24
Sunnyside	11·61	0·81
Teign	12·24	0·12
Umvukwe Flats	—	—
Volynia Ranche	9·21	2·50
Waterfall Farm	—	—
Melsetter—		
Brackenburg	4·45	0·69
Chikore	5·92	2·10
Chipinga	4·92	1·85
Helvetia	4·21	6·35
Melsetter	7·82	2·13
Mount Selinda	7·43	4·88
Mutambara Mission	3·72	1·32
Pasture	4·51	0·16
Tom's Hope	5·95	5·24
Vermont	6·78	5·15
Salisbury—		
Ardbennie	4·68	1·20
Avondale	8·31	1·20
Botanical Experiment Station	6·23	1·41
Bromley	5·68	1·48
Brookmead	—	—
Borrowdale	9·92	1·60
Chishawasha	6·44	0·68
Cleveland Reservoir	4·66	0·83
Forest Nursery	6·50	1·77
Glenara	—	—
Goromonzi	7·31	0·47
Gwebi	12·04	0·71
Hillside	5·37	0·70
Lilfordia	8·04	—

RAINFALL *(Continued).*

Station	January	February
MASHONALAND—(Continued)		
Salisbury—continued		
Salisbury (Gaol)	7·00	1·81
,, (Railway)	5·48	1·76
Sebastopol	4·71	—
Selby	7·95	—
Stapleford	9·65	1·10
The Meadows	6·04	—
Vamona	7·56	1·44
Westridge	6·20	1·07
Umtali—		
Chiconga's Location	3·00	1·51
Odzani	4·05	0·47
Penhalonga	—	—
Premier Estate	4·13	1·91
Public School	3·92	1·26
Stralsrund...	5·03	0·58
Summerfield	4·49	1·39
Umtali (Railway)	3·40	1·22
Utopia	5·80	—
Urungwe—		
Nassau Estate	13·08	2·87
Victoria—		
Bikita	7·59	0·28
Brucehame	2·59	0·11
Chibi	3·82	Nil
Chilimanzi	4·94	—
Chingombe	2·63	Nil
Chiredzi Ranche, Ndanga	1·79	0·34
Clipsham	4·72	0·05
Eagle's Nest Ranche	4·96	0·50
Elephant Hill	—	—
Empress Mine	7·41	Nil
Eythorne	3·11	0·21
Fairburn	3·98	0·67
Fort Victoria	3·04	0·45
Gokomere	4·82	0·25
Gutu	4·51	Nil
Hunzanga	—	—
Makorsi River Ranche	5·04	0·11
Marah Ranche	7·71	—
Marthadale	5·21	0·50
Morgenster	6·98	0·19
Ndanga	5·43	0·24
Pamushana	5·02	—
Silver Oaks	7·41	0·20
Tokwe River Ranche...	4·58	0·52
Victoria	3·31	0·38
MATABELELAND :		
Belingwe—		
Albany	6·06	0·09
Anglo-French Block	6·64	—
Filabusi	1·76	Nil
Fort Rixon	3·35	0·02

RAINFALL *(Continued).*

Station	January	February
MATABELELAND—(Continued)		
Belingwe—continued		
Infiningwe	3·24	—
Insiza (Railway)	5·53	0·31
Mooifontein	—	—
Orangevale	4·77	Nil
Roodeheuvel	4·57	Nil
Scaleby	2·52	0·06
Shangani Estates	7·39	Nil
Shangani (Railway)	4·33	0·30
Tamba	1·36	0·54
Thornville	6·66	2·08
Wedza	2·16	1·22
Bubi—		
Inyati	5·08	0·25
Leighton Farm	—	—
Lochard Experiment Farm	5·21	0·19
Bulalima—		
Figtree	—	—
Mholi (late Magot)	4·05	0·45
Marula	—	—
Plumtree School	2·01	0·27
Riverbank Farm	3·92	0·30
Solusi Mission	4·30	0·90
Syringa	2·86	1·35
Tegwani	—	—
Tjompanie	1·52	0·09
Bulawayo—		
Balla Balla (Railway)	3·41	—
Bembesi (Railway)	3·60	0·16
Bulawayo (Railway)	—	—
Crombie's	4·15	0·15
Edwaleni	5·24	0·23
Essexvale	3·80	Nil
Government House	—	—
Gwaai (Railway)	2·36	1·40
Heany Junction (Railway)	3·20	0·47
Holly's Hope	1·60	0·37
Hope Fountain	3·69	0·11
Imbesu Kraal	2·73	0·43
Impondemi	5·09	1·59
Keendale	2·35	0·38
Khami	3·26	0·03
Lower Rangemore	3·41	0·73
Matopo Mission	2·23	0·79
Maxim Hill	3·96	0·25
Melinakanda Junction	3·47	—
Naseby	4·27	0·32
Nyamandhlovu (Railway)	2·80	0·24
Observatory	4·37	—
Raylton	3·06	0·47
Rhodes Matopo Park	3·03	0·09
Springs	3·05	0·10
Umkien	4·12	—
Umgusa	2·02	0·57

RAINFALL *(Continued)*

Station	January	February
MATABELELAND—(Continued)		
Gwanda—		
Antelope Mine	1·45	0·35
Gwanda (Railway)	1·96	Nil
,, (Gaol)	2·37	Nil
Malundi	—	—
Mtshabzi Mission	1·61	0·01
West Nicholson (Railway)	1·30	—
Gwelo—		
Coppy Nook	—	—
Dawn	3·34	0·25
Gwelo (Gaol)	8·35	0·09
Gwelo (Railway)	4·89	0·12
Globe and Phœnix (Railway)	10·35	0·10
Globe and Phœnix Mine	—	—
Hagley	—	—
Indiva Farm	—	—
Lalapanzi	—	—
Lalapanzi (Railway)	4·36	0·05
Lovers' Walk	0·17	—
Lower Gwelo	6·82	0·05
Que Que	7·60	0·16
Rhodesdale Estate	8·39	0·98
Selukwe (Railway)	8·35	0·27
Sikombela Farm	8·53	1·05
Troy	5·83	0·15
Umhlali Farm	—	—
Woodendhose	5·40	0·26
Mafungabusi—		
Gokwe	8·01	0·14
Inyoka	8·79	0·20
Mangwe—		
Empandeni	1·83	0·95
Garth	3·05	0·55
Tuli—		
Lamulas	1·97	0·16
Langalanga	1·67	Nil
Makalali	2·45	0·14
Manantji	1·98	0·04
Mapande	2·25	0·12
Mazunga	1·89	0·25
Tuli	0·93	0·05
Wankie—		
Bombusi	4·33	0·37
Guyo	—	—
Malindi (Railway)	5·08	0·34
Victoria Falls	—	2·57
Victoria Falls (Railway)	1·47	2·08
Wankie Hospital	2·34	Nil
Wankie (Railway)	3·77	0·02

— No return.

Dates of Meetings of Farmers' Associations, Southern Rhodesia

(SUBJECT TO ALTERATION)

Name of Association	Place of Meeting	Secretary	1916		
			April	May	June
Beatrice Road	Various farmhouses	H. W. Harris	12	10	14
Bembesi	Queen's Mine Hotel	V. C. Andrews	7	5	2
Bindura	Bindura	A. C. Mills	8	..	10
Charter—Mgezi	Beatrice Mine	W. Krienke	26	31	28
Central	Umvuma	B. M. Yorke	..	..	..
Eastern Border (South Melsetter)	Various farmhouses	J. W. Scott	5	3	7
Enterprise	Arcturus Hotel	J. Watson	5	3	7
Felixburg	Felixburg	R. H. Brown	29	27	24
Figtree Branch, R.L. and F.A.	Figtree Hotel	W. H. Robertson	1	..	3
Gatooma	Gatooma	T. J. Golding	15	20	17
Gazaland	Chipinga	W. Wood	29	27	24
Greystone	Roodeheuvel Farm, Shangani	J. W. Spencer	8	13	10
Hartley	Hartley	J. de L. Nimmo	15	13	10
Headlands	Headlands	J. M. Harvard	29	27	24
Hunter's Road Farmers and Stockowners	Hunter's Road Siding	R. H. Twilley	8	13	10
Insiza—Shangani	Shangani	T. E. Penny	..	3	..
Iron Mine Hill Proper	Iron Mine Hill	T. Irving	8	13	10
Lalapanzi and Iron Mine Hill	Lalapanzi and Iron Mine Hill	Cyril Allen	8	13	10
Lomagundi	Sinoia	W. Abbott	15	20	17
Macheke	Macheke	W. J. K. Webster	No dates fixed		
Makwiro	Makwiro	T. R. McLellan	21	19	16
Marandellas and Mangwendi	Marandellas Farmers' Hall	A. Nicholson	..	..	..
Makoni	Rusape	H. Barnes Pope	1	6	3
Marula	Marula Siding	Mac. W. Ingram	22	27	24
Mashonaland	Commercial Hotel, Salisbury	J. Reid Rowland	5	3	7
Matopo Branch, R.L. and F.A.	Sibali	W. Bathurst	..	10	..
Mazoe	Glendale Siding	R. S. Newett	..	17	..
Melsetter (North)	Various farms	Rev. R. Wodehouse	..	6	..
Midlands	Gwelo	P.O. Box 23, Gwelo	8	13	10
Northern Umtali	Farm "Summerfield"	R. O. H. Blurton	..	6	..
Norton and District	Norton Siding	T. A. Osler	1	6	3
Que Que	Que Que	E. J. Ross	15	20	17
Rhodesian Landowners and Farmers	Library Buildings, Bulawayo	H. S. Hopkins	28	26	30
Shamva	Shamva	J. M. Moubray	..	17	..
Selukwe	Selukwe	F. S. Clark	No dates fixed		
Somabula and Shangani Flats	Weltevrede School	G. B. Botha	..	13	..
Umvukwe	Various ranches	H. K. Bracewell	8	13	10
Umtali	Christmas Pass Hotel	J. S. Holland	1	6	3
Victoria	Victoria	H. S. Hoatson	19	17	21
Vungu	Vungu	J. H. Erasmus	..	..	..
Western	Plumtree Hotel	A. Barclay	8	13	10

Departmental Notices.

Information for Farmers

The Department of Agriculture is prepared to furnish to farmers technical advice either by correspondence, or, where possible, by personal visits. All communications should be addressed in the first instance to the Director of Agriculture.

Crops

The Agricultural Branch deals with enquiries relating to agricultural practice, soils, crops, cultural operations, processes, seeds, trees, farm implements and machinery, etc.

Disposal of Pure Seed.

Farmers devoting special attention to the production of pure seed of any locally grown crops are invited to communicate with the Government Agriculturist, and at the same time to submit a ¼ lb. sample of any seed which they may have for disposal.

In addition to indicating the total amount of seed offered and the price f.o.r. the nearest railway station or siding, the correct name of the variety and the origin of the seed from which the crop was grown should be given. In the case of special attention having been devoted to seed selection, the methods employed should be described.

Where these stipulations are complied with, and the samples forwarded are deemed by the Agriculturist of sufficiently high quality for seed purposes, growers and intending purchasers will be put in touch with one another. It is hoped by this means to encourage the production of pure seed, and growers are urged whenever possible to sell their seed under guarantee of trueness to name, type and sample deposited with the Department.

After placing growers and would-be purchasers in touch with one another, the Department can accept no further responsibility except in the position of adjudicator when bulk supplies are thought inferior to sample and description, in

which case both parties will be required to abide by the decision of the Department.

For further particulars see article on Pure Seed Supply, *Rhodesia Agricultural Journal*, February, 1914.

Poisonous Plants

It is of great importance that as soon as possible a study should be made of those plants found in Southern Rhodesia which are poisonous or deleterious to small or large stock. Farmers and others who have known, or suspected poisonous plants on their property, are requested to communicate with the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, at the same time forwarding specimens of the plant, including stem, leaves, flowers, and, where possible, fruit. Any particular regarding the habits of the plant will be welcomed, and in return the Department will supply all available information regarding the plants.

Live Stock

The Animal Industry Branch is prepared to advise with regard to all matters connected with stock breeding, selection, feeding and registration of stud animals, the dairy industry, poultry management, farm buildings for stock, and kindred subjects. Buyers and sellers of stud stock in Rhodesia are also put in touch with one another.

Entomology

The Government Entomologist advises on matters connected with insect pests of live stock, crops, and fruit trees, and also undertakes the inspection of nurseries and of the importation of plants from abroad.

Chemical Analyses

The Government Agricultural Chemist deals with matters relating to the composition of soils, fertilisers, farm produce of vegetable or animal origin; also the investigation of poisons and of articles of potential economic value.

Nominal charges are made, which, while not covering the cost, will help to defray the expense and serve as a proof of good faith. Samples, carriage prepaid, together with full particulars regarding the subject should be addressed to the Agricultural Chemist, Department of Agriculture, Salisbury.

A schedule of charges and directions for taking samples will be furnished on application.

With all analyses, reports will be furnished explanatory of the results and, when possible, advice given as to the nature, properties and value of the material.

No charge will be made for analysis where the material forwarded is considered by the Director of Agriculture and Chemist to be of sufficient general interest.

Citrus Culture

The Government Citrus Adviser advises on all matters connected with the citrus and deciduous fruit industry.

Services of Government Veterinary Surgeons

1. The services of Government Veterinary Surgeons are available to the public, free of charge, for the following purposes only :—

(1) Attending and giving professional advice in connection with the following diseases, viz. :—Anthrax, Contagious abortion, East Coast Fever, Epizootic Lymphangitis, Foot and Mouth Disease, Farcy, Foot-rot, Heartwater, Glanders, Intestinal parasites amongst sheep and goats, Liver Disease, Lungsickness, Osteo Porosis, Malarial Catarrhal Fever (blue tongue), Rabies, Redwater, Rinderpest, Scabies, Sponziekte (quarter evil), Swine Fever, and any other diseases which may in future be scheduled in terms of section 3, sub-section 18 of the "Animals Diseases Consolidation Ordinance, 1906." Attending to cases of disease amongst live stock which, though not of a contagious or infectious character, may be of general public importance.

(2) Applying tests in regard to Glanders, Tuberculosis, or any other disease against the introduction or spread of which tests are applied under regulations.

(3) Inoculations against the following diseases :—

Horsesickness, Lungsickness, Anthrax, Quarter Evil, Redwater, Malarial Catarrhal Fever (blue tongue). A fee to cover the cost of serum and virus will be charged.

2. The following charges shall be made and payable for services rendered by the Government Veterinary Surgeons in other cases, viz. :—

	£	s.	d.
(1) For every professional visit within three miles of his office or residence	0	5	0
(2) For every professional visit beyond such distance	0	10	6
plus an additional charge of 2/6 per hour whilst engaged in such visits or £2/2/0 a day of 24 hours;			
(3) For advice given at the Veterinary Surgeon's office, for each animal, per visit	0	2	6
(4) The following to be charged in addition to visiting fees :—			
a. For every examination as to soundness, each	1	1	0
b. For castration, horses, each	1	1	0
c. For castration, bulls, each	0	5	0
d. For castration, donkeys, each.. ...	0	10	6
e. For parturition cases, mares, each	2	2	0
f. For parturition cases, cows, each..	1	1	0
g. For other operations, according to nature, from 5/- to £2/2/0.			

3. Double the above fees will be payable for services rendered on Sundays, public holidays, and between the hours of 7 p.m. and 7 a.m.

4. Applicants for the services of Government Veterinary Surgeons must at their own cost provide the necessary transport for the conveyance of these officers from, and back to, their residence or nearest railway station.

5. Farmers and owners of stock throughout the country frequently telegraph for a Government Veterinary Surgeon to be sent to attend an animal which has been taken seriously ill. It is rarely possible to comply with these requests at once, as the Veterinary Surgeon may be engaged on duty which he cannot leave, or is at such a distance from where his services are required that he can hardly be expected to arrive in time to be of any service in an urgent case. Hence much valuable time is wasted, the owner of the animal is dissatisfied, and the veterinary staff discredited. To obviate this, in all cases where veterinary advice and assistance are required, the owner should telegraph to "Veteran," Salisbury, with prepaid reply, the nature of the complaint that the animal is suffering from, giving as full and accurate a description of the symptoms as possible. This will enable the Chief Veterinary Surgeon to telegraph advice at once and state whether he is able to arrange for veterinary attendance on the case or not, and save valuable time, which is always of importance in acute cases.

6. The services of Government Veterinary Surgeons will only be available for private work with the consent of such officers, and when such work does not interfere with their official duties, or when the services of a private practitioner are not available.

7. As the arrangement of allowing Government Veterinary Surgeons to attend to private cases is intended purely for the benefit of farmers and stock-owners who may wish to obtain professional advice, no responsibility whatever will be accepted for any loss of stock, etc., which may result from the negligent treatment or advice, or wilful default, of any Government Veterinary Surgeon.

8. All fees collected in terms of these Regulations are payable to the Treasury through the local Receiver of Revenue.

Irrigation

From the Agricultural Engineer assistance may be obtained by farmers for the following :—

1. In the locating of possible irrigation projects.
2. In the preparation of surveys or plans and for irrigation works, including weirs, dams, furrows, pumping

plants, and determining the extent of land which may be brought under irrigation schemes, together with rough estimates of costs.

3. In the supervision of construction and carrying out of projects.
4. In the selection of suitable sites for boring operations.
5. Preparing specifications, etc., regarding pumping plants, windmills, and agricultural machinery.
6. Giving general advice on cognate subjects.

Informal advice of a general character will be given to applicants making enquiry by letter or in person. Any applicant desiring professional assistance likely to occupy more than one day should apply for advice in writing. All applicants should specify clearly the nature of the project on which they seek advice, and should give full particulars as to the distance and direction of their farms from some well-known centre. Applicants will be required to provide suitable means of transport for the officer concerned during the period devoted to work on the spot; to provide any unskilled labour that may be required; and to provide for any other contingent services. Applications should be addressed to the Director of Agriculture, who will endeavour to arrange visits as far as possible in order of application, but with due regard to situation, in order to obviate unnecessary travelling and delay. The services of the Agricultural Engineer are given free, but in cases demanding prolonged individual attention, or repeated supervision, a charge may be made according to circumstances.

Samples

In connection with enquiries, especially with regard to diseases amongst crops, insect pests, soils, grain and the identification of plants, specimens should, wherever possible, be sent, together with full details. It is found that such parcels are often forwarded without any indication of where they are from or why they were sent and it is difficult in such cases to trace the sender. It is, therefore, requested that persons when forwarding samples for examination, indicate clearly their names and address on the package, so as to enable their requirements to be attended to without delay.

Charges for Dipping Cattle at Government Dipping Tanks.

A charge of 1d. per head is made in respect of all cattle dipped at Government dipping tanks.

Unweaned calves will be dipped free of charge.

Payment may be made in cash or by means of books of coupons at £1, 10/- and 2/6, which can be obtained from Civil Commissioners, Native Commissioners, or through all Veterinary Surgeons and Cattle Inspectors.

The tanks to which these provisions at present apply are the following :—

Salisbury (3), Bulawayo (3), Inyati, Umtali, Penhalonga, Melsetter, Marandellas, Macheke, Mazoe, Lomagundi, Hartley, Gwelo, Selukwe, Enkeldoorn, Victoria, Gwanda, Gatooma, Que Que, Umvuma, Kimberley Reefs.

Lectures for Farmers

The services of certain of the officers of the Department of Agriculture and the Veterinary Department are available for purposes of delivering lectures on subjects upon which they have special knowledge. As far as practicable, lectures will be accompanied by demonstrations at the time or subsequently in the field. Owing to the many calls on the time of the staff and the exigencies of their duties, alternative dates are desirable in order to avoid disappointment. The following topics are offered as examples of subjects that may be dealt with in this manner, but the suggestion of other themes is invited.

Agriculture.—Maize growing; Maize selection and maintenance of the breeding plot; Points of maize and maize judging, with demonstrations; Utilisation of granite vlei soils; Ground nut culture; Rotation crops for home use and for sale; Veld improvement by winter grasses; Production of foodstuffs for the mines; Ensilage; Fungoid diseases of maize and wheat; Wheat, oats and lucerne under irrigation; The prospects of cotton culture in Southern Rhodesia.

Veterinary Hygiene.—Detection and prevention of disease; The care of live stock.

Live Stock.—Judging of cattle according to breeds, and for beef, milk and draught; feeding and kraaling of live stock; general principles of cattle breeding; management of imported stock; grading up of native or local stock with pure bred bulls.

Dairying.—Home butter-making; building and equipment of a farm dairy; handling and marketing of milk; packing and marketing of butter; construction of cow houses.

Swine Husbandry.—Breeding and feeding of swine; some suggestions for the production of first-class bacon pigs; construction of piggeries at moderate cost.

Chemistry.—The principles of soil fertility; the principles of manuring; the value of lime in agriculture; chemistry of milk and its products (accompanied by demonstrations in milk-testing).

Entomology.—Economic entomology on the farm; the role of insects and their allies in the transmission of disease; scale insects and fruit trees and methods for their control; insect pests and maize; enemies of the potato, insect and fungus; the value and objects of plant import and nursery regulations.

Irrigation.—Methods of applying water to land for irrigation; the measurement of water in connection with irrigation; canal irrigation; storage reservoirs; hints on the selection of sites and on the design of earthen and other dams; irrigation by pumping, with notes on the selection of plants.

Enquiries and invitations should in the first instance be addressed to the Director of Agriculture, Salisbury.

Departmental Bulletins.

The following Bulletins, consisting of reprints of articles which have appeared in this Journal, are available for distribution free of charge to applicants in Rhodesia :—

AGRICULTURE.

No. 61. Requirements in sending Botanical Specimens to the Department for Identification.

No. 62. Services of Agricultural Engineer.

No. 64. Hints on Irrigation—Small Gravitation Schemes, by W. M. Watt.

No. 81. Possibilities of Export Trade in Oil Seeds, by H. Godfrey Mundy, F.L.S.

No. 90. Reports on Experiments—Experimental Station, Salisbury, 1910-1911, by J. H. Hampton.

No. 94. Second Report on Experiments, by J. H. Hampton.

No. 125. Subterranean Water, by W. M. Watt.

No. 155. The Manuring of Maize on the Government Experimental Farm, Gwebi, 1912-13.

No. 160. Hints on Irrigation—Pumping Plants, by W. M. Watt, Agricultural Engineer.

No. 177. Notes on the Raising of Seedling Trees, by F. B. Willoughby.

No. 189. The Manuring of Maize on the Government Experiment Farm, Gwebi, by G. N. Blackshaw, B.Sc., F.C.S.

No. 192. A Calendar of Crop Sowings, by H. Godfrey Mundy, F.L.S.

No. 203. Ensilage, by J. A. T. Walters, B.A., and The Feeding of Ensilage to Dairy Cattle in Winter, by R. C. Simmons.

No. 206. Hints on Irrigation : Small Earthen Storage Reservoirs, by W. M. Watt.

No. 209. The Agricultural Returns for 1914, by B. Haslewood, F.S.S.

No. 212. Citrus Fruits in Rhodesia, by A. G. Turner.

No. 216. Manuring of Maize on Government Experiment Farm, Gwebi, by A. G. Holborow, F.I.C.

No. 218. Useful Measurements of Maize, by J. A. T. Walters, B.A.

No. 220. Reports on Crop Experiments, Gwebi, 1914-15, by E. A. Nobbs, Ph.D., B.Sc.

No. 221. Results of Experiments, Longila, 1914-15, by J. Muirhead.

No. 222. Costs of Farm Operations, Gwebi.

No. 300. The Dangers and Prevention of Soil Erosion, by W. M. Watt.

Tree Culture in Southern Rhodesia, by P. B. S. Wrey, A.M.I.C.E

CROPS.

No. 88. Chicory Growing, by H. Godfrey Mundy, F.L.S.
No. 106. Cultivation and Preparation of Ginger.
No. 126. Turkish Tobacco.
No. 132. Sumatra Tobacco, Hints to Rhodesian Growers, by C. J. Sketchley.
No. 138. Tobacco Culture (Virginia)—Harvesting and Curing.
No. 162. Rhodesian Maize: The Principal Types and their Points, by J. A. T. Walters, B.A., Assistant Agriculturist.
No. 170. Production of Pedigree Seed—Maize, by H. Godfrey Mundy, F.L.S.
No. 174. Notes on Hop Growing, by H. Godfrey Mundy, F.L.S.
No. 175. Notes on Lucerne, by H. Godfrey Mundy, F.L.S.
No. 176. The Cultivation of Castor Oil Beans, by H. Godfrey Mundy, F.L.S.
No. 179. Buckwheat, by H. G. Mundy, F.L.S.
No. 181. Sunflower Cultivation, by H. G. Mundy, F.L.S.
No. 188. The Ground-Nut or Monkey Nut, by H. Godfrey Mundy, F.L.S.
No. 193. Oats in Southern Rhodesia, by H. Godfrey Mundy, F.L.S.
No. 194. Rye, by J. A. T. Walters, B.A.
No. 201. Dhal or Pigeon-Pea, by J. A. T. Walters, B.A.
No. 207. Crop Rotation in Southern Rhodesia, by J. A. T. Walters, B.A.
No. 225. Napier Fodder or Elephant Grass, by J. A. T. Walters, B.A.

ENTOMOLOGY AND VEGETABLE PATHOLOGY.

No. 43. Citrus Psylla.
No. 75. Fumigation of Fruit Trees with Hydrocyanic Acid Gas, by R. W. Jack, F.E.S.
No. 139. Termites, or "White Ants," by Rupert W. Jack, F.E.S.
No. 140. Insect Pests of Tobacco in Southern Rhodesia, by R. W. Jack, F.E.S.
No. 142. The Bean Stem Maggot, by R. W. Jack, F.E.S.
No. 147. Root Gallworn, by R. W. Jack, F.E.S.
No. 148. Darkling Beetle Grubs Injurious to Tobacco, by R. W. Jack, F.E.S.
No. 151. Potato Spraying Experiments for the Control of Early Blight, by Rupert W. Jack, F.E.S.
No. 154. Borers in Native Timber—Results of Experiments with Preservatives, by Rupert W. Jack, F.E.S.
No. 158. Two Ladybirds Injurious to Potato Plants, by R. W. Jack, F.E.S.
No. 171. The Cabbage Web-Worm—A Pest of Cabbage and Allied Plants, by R. W. Jack, F.E.S.
No. 172. Diseases of the Potato Tuber and the Selection of Sound Seed, by R. W. Jack, F.E.S.
No. 178. Illustrations of Natural Forest in relation to Tsetse Fly, by R. W. Jack, F.E.S.
No. 187. The Dusty Surface Beetle, by Rupert W. Jack, F.E.S.
No. 197. Chafer Beetles, by R. W. Jack, F.E.S.
No. 204. Some Injurious Caterpillars, by R. W. Jack, F.E.S.
No. 214. Some Household Insects, by R. Lowe Thompson, B.A.
No. 219. More Household Insects, by R. Lowe Thompson, B.A.

VETERINARY.

No. 50. Epizootic Abortion in Cattle, by Ll. E. W. Bevan, M.R.C.V.S.

No. 51. Strangles, by F. D. Ferguson, M.R.C.V.S.

No. 53. Animals Diseases Consolidation Ordinance, 1904.

No. 65. Common Ailments of the Horse, by D. R. Chatterley, M.R.C.V.S.

No. 84. African Coast Fever—Diagnosis of Gland Puncture, by Ll. E. W. Bevan, M.R.C.V.S.

No. 95. Oestrus-ovis in Sheep, by Alec King.

No. 103. Dipping and Tick-Destroying Agents, by Lt.-Col. H. Watkins-Pitchford.

No. 121. Rabies, by Ll. E. W. Bevan, M.R.C.V.S., and T. G. Millington, M.R.C.V.S., D.V.H.

No. 165. Report of Veterinary Conference, Bulawayo, April, 1913.

No. 180. Note on the Treatment of Biliary Fever of the Horse with Trypan Blue, by Ll. E. W. Bevan, M.R.C.V.S.

No. 191. Scab or Scabies in Sheep and Goats, by Rowland Williams, M.R.C.V.S.

No. 195. Some Notes on the Systematic Dipping of Stock, by C. R. Edmonds, Assistant Chief Veterinary Surgeon, and Ll. E. W. Bevan, Government Veterinary Bacteriologist, Southern Rhodesia.

No. 202. Distomatosis or Liver Fluke in Cattle and Sheep, by Rowland Williams, M.R.C.V.S.

No. 215. African Coast Fever, by Ll. E. W. Bevan, M.R.C.V.S.

No. 223. A Note on Contagious Abortion, by Ll. E. W. Bevan, Government Veterinary Bacteriologist.

LIVE STOCK.

No. 96. Swine Breeds and Breeding of, by Loudon M. Douglas, F.R.S.E.

No. 101. Hints to Dairy Farmers, by J. C. Jesser Coope, F.C.S., N.D.D.

No. 145. Prospects for Importation of Cattle from Australia, by Eric A. Nobbs, Ph.D., B.Sc.

No. 161. Notes on Cattle Breeding, Part III., by R. C. Simmons.

No. 163. Feeding and Care of Imported Cattle, by R. C. Simmons.

No. 167. The Construction of Dipping Tanks for Cattle.

No. 190. The Principle of the Winter Feeding of Dairy Cattle, by R. C. Simmons.

No. 208. Water in the Diet of Live Stock, by Ll. E. W. Bevan, M.R.C.V.S.

No. 210. The Care and Feeding of Calves in Dairy and Stud Herds, by R. C. Simmons.

No. 211. The Fattening of Pigs on Granite Farms in Mashonaland, by R. C. Simmons.

No. 227. An Experiment in Beef Production, by R. C. Simmons.

MISCELLANEOUS.

No. 93. Formation of Agricultural Credit Associations in Rhodesia, by Loudon M. Douglas, F.R.S.E.

No. 119. Some Notes on Charcoal Burning, by Eric A. Nobbs, Ph.D., B.Sc.

No. 129. How to Make Use of the "Fencing Ordinance, 1904," by N. H. Chataway.

No. 134. Plans and Specifications for Flue Curing Tobacco Barns.

No. 144. Rhodesian Tobacco—Prospects of an Australian Market, by Eric A. Nobbs, Ph.D., B.Sc.

No. 152. A School of Agriculture for Southern Rhodesia, by Eric A. Nobbs, Ph.D., B.Sc., Director of Agriculture.

No. 157. Hints on Brickmaking, by G. T. Dyke.

No. 168. Report on the Methods of Growing, Curing and Selling Bright Tobacco in Virginia, U.S.A., by H. Kay Scorror.

No. 183. The Rainy Season in Southern Rhodesia, by the Rev. E. Goetz, S.J.

No. 184 Cream—Its Separation, Handling and Sale to Butter Factories, by R. C. Simmons.

No. 186. Concrete and Reinforced Concrete, by E. Hardcastle, M.I.E.E.

No. 196. Collection of Agricultural Statistics in Southern Rhodesia, by Eric A. Nobbs, Ph.D., B.Sc.

No. 198. Poultry Keeping for the Rhodesian Farmer, by Frank Sheppard.

No. 199. Eucalypts for the Farm, by J. J. Boocock.

No. 205. Home Butter Making, by R. C. Simmons.

No. 213. Hydraulic Rams, by W. Martin Watt.

No. 217. Windbreaks and Hedges, by F. B. Willoughby.

No. 224. Statistical Returns of Crops, 1914-15, by E. A. Nobbs, Ph.D., B.Sc., and B. Haslewood, F.S.S.

No. 226. Classification of Clouds.

Malarial Fever : How it is caused and how it may be prevented, by Sir Ronald Ross, F.R.C.S., D.Sc., LL.D., F.R.S., K.C.B., etc.

Malaria : its History, Prevention and Cure, by A. M. Fleming, C.M.G., M.B., F.R.C.S. (Ed.), D.P.H. (Camb.), Medical Director.

Game Law : Summary of.

Terms for Analysis by the Department of Agriculture, of Produce, Soils, Water, etc

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HANDBOOK OF TOBACCO CULTURE for Planters in Southern Rhodesia. Sold by the Department of Agriculture. 2/6.

Employment on Farms.

The Department of Agriculture receives numerous enquiries from persons of varied attainments, age and financial position for openings on farms, as managers, assistants and learners, requiring remuneration on corresponding scales, or willing to give services in return for keep.

In order that work may be found for the above and needs of farmers met, applications are invited from both employers and persons seeking employment. Applications are also invited from artisans, such as masons, bricklayers, carpenters, fencers, well sinkers, concrete workers, and the like who may desire work on farms. In cases where employers have obtained the labour they require, or applicants for employment have found work, it is requested that notification be at once sent to the Department of Agriculture, in order that unnecessary correspondence be avoided.

Replies to the following applications should be addressed to the initials of the advertisers, c/o Director of Agriculture, who will forward the letter to the party referred to.

Note.—The following advertisements will not be repeated unless the advertisers inform us they wish them to be continued:—

SITUATIONS VACANT.

J. C. J.—For learner; must be strong and willing to give services in return for keep. Rusape.

W. M.—Young man as overseer of labour. Native language necessary. Small salary if satisfactory.

J. S.—Experienced man having team of oxen to work farm on terms. Married man preferred.

SITUATIONS WANTED.

M. & S.—Two young Belgians, discharged from army medically unfit, wishing to settle in Rhodesia, desire to work on farms as learners in return for board and lodging.

J. C. C.—Married man, 45, with 21 years' experience, partly in Rhodesia, desires employment as manager of farm or ranch.

D. J.—As manager. Fifteen years' experience. Temperate, industrious. Good testimonials.

C. J. P. W.—Employment on farm wanted by a Rhodesian.

A. F. O.—Employment as assistant. Rhodesian experience.

P. W. W.—As manager of mixed farm, dairy, etc., with small salary and interest in stock. Married. Rhodesian and Colonial experience. Reference Mr. R. C. Simmons, Agricultural Department.

G. R. P.—Intending settler wishes to take charge of mixed farm to learn local conditions. Married; wife would look after dairy. Age 25; bilingual.

L. P.—Young man prepared to assist on or take charge of ranch. Rhodesian experience of general ranch work.

A. B. B.—As farm manager; experienced in general farming in Natal and Rhodesia; salary or salary and shares.

F. C. W. R.—As farm manager; life-long experience of farming in Rhodesia and Union; cattle and agriculture.

G. J. P.—As farm manager, by English Colonial married man; life-long experience of farming, all branches; good references.

B. C.—As learner; cattle ranch preferred.

J. P.—Wants temporary work, before taking up own farm, for a few months.

L. L. N.—As assistant or manager; Natal and Rhodesian experience; willing to work on trial.

W. M.—As manager of ranch or estate; Britisher, experienced with pure and grade stock and veterinary work; knowledge of general agriculture.

A. T. P.—As learner; strong, intelligent, willing; will work in any capacity.

Government Notices.

No. 50 of 1912.] [8th February, 1912.

(As amended by Nos. 329 and 383 of 1914.)

AFRICAN COAST FEVER.

Regulations regarding the movement of cattle and the prevention and suppression of disease.

1. UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw Government Notices Nos. 329 of 1910 and 308 of 1911 and make the following provisions in lieu thereof :—

2. The various districts of Southern Rhodesia are hereby declared an area infected with African Coast Fever for the purposes of section 5 (2) of the aforesaid Ordinance, and, save as hereinafter set out, all movement of cattle within the said districts is prohibited until further notice.

General Movement.

3. For the purpose of section 22 (1) of the said Ordinance, the following shall be regarded as places within the boundaries of which the movement of cattle may be allowed without special permission :—

(a) Single farm.

(b) An area occupied by an owner or lessee, under one management, comprising contiguous farms and situated within one cattle transport area. The mere possession by an owner or lessee of grazing rights over a contiguous farm or farms shall not constitute occupation of such farm or farms.

(c) An area the property of one owner.

(d) For grazing purposes, an area within a radius of four miles of native kraals situated on unalienated land or in reserves, save and in so far as such area includes any private land.

The sites of such kraals shall be deemed to be the places where they are situated at the date of promulgation of these regulations.

(e) An area under the management or control of any Municipality, Sanitary Board or Village Management Board.

4. Notwithstanding the provisions of the last preceding section, or of section 9 hereof, the Chief Inspector may, on the outbreak of disease, or for such other cause as may be deemed expedient, direct the isolation or quarantine of cattle on a limited area of the aforesaid places.

5. The movement of cattle from place to place may be permitted under the special permission, in writing, of an Inspector, Sub-Inspector, or other officer or person duly authorised by the Administrator to grant such permission.

6. No permission as aforesaid shall permit the movement of cattle—

(a) Without the written consent of the owners, occupiers or managers of occupied land, and in the case of native reserves, of the Native Commissioner of the district over which land or reserve such

cattle will pass, whether along roads or otherwise; provided, however, that refusal to grant such consent shall be in writing, and provided further that if the Controller of Stock or the Chief Inspector shall consider that such consent is withheld without good and sufficient cause he may permit of movement without such consent.

If any such person mentioned above refuse to give consent or to state a reason for refusing to do so in writing, no valid objection shall be deemed to exist and movement may be permitted without such written consent.

(b) Within a veterinary district as defined in the Schedule annexed hereto from one transport area to or through another without the consent of the Cattle Inspector in charge of such area.

(c) From any veterinary district to or through another without the consent of the District Veterinary Surgeon of such district.

Slaughter Cattle.

7. Cattle moved to any centre for slaughter under the provisions of these or any other regulations shall, on arrival, be immediately taken to such quarantine area (if any) as is provided for the purpose and immediately branded with the letters "V.D." on the near hip.

8. Cattle admitted to a quarantine area in terms of the last preceding section shall be slaughtered within twenty-one days of the date of admission, and shall not be permitted to leave the same except for the purpose of being slaughtered at the appointed abattoir, and if found outside such area, except for the said purpose, may be destroyed on the order of the Chief Inspector or Controller of Stock; provided, however, that the Chief Inspector may allow the removal of cattle from such an area under such conditions as he may prescribe.

Transport Cattle.

9. The use of cattle for draught purposes is prohibited except :—

(1) Within the boundaries of the places defined in section 3 (a), (b) and (c) hereof.

(2) Within the boundaries of areas already fixed for the use of cattle for draught purposes in terms of regulations published under Government Notice No. 329 of 1910, or such other areas as may be fixed by the Administrator.

10. Notwithstanding the provisions of section 9, no permit shall authorise the working of cattle

(a) which are not clearly and distinctly branded with the registered brand of the owner;

(b) in any wagon or vehicle which shall not have the owner's name and address legibly and permanently inscribed on the right side thereof.

11. No wagon or other vehicle drawn by oxen shall be moved from one cattle transport area into another without the permission of the Cattle Inspectors concerned, and under such conditions as they may impose.

General Provisions.

12. On the outbreak or suspected outbreak of disease, the Administrator may declare an area of infection around and embracing the place of outbreak or suspected outbreak, and a further area or areas around such area of infection as a guard area, whereupon all movement of cattle into and from place to place within such area or areas shall be immediately suspended, except as hereinafter provided.

A.—*In areas of infection and guard areas:—*

(1) Cattle in transit by rail may be moved through such area.

(2) Cattle from beyond the borders of Southern Rhodesia may be detrained within such area or areas *en route* to destination.

(3) Cattle for *bona fide* farming, dairy and slaughter purposes may be moved into such area or areas by permission of the Chief Inspector and under such conditions as he may impose.

B.—*In guard areas only:—*

Cattle may be moved into and from place to place within such area under the conditions of section 6 hereof.

13. The removal of green forage, hay, fodder, bedding reeds, manure or of such other articles as may be reasonably supposed capable of conveying infection, shall be prohibited from areas of infection, save and except with the special permission of the Administrator.

14. Whenever an area shall have been declared under section 12 hereof, every person within such area, or within such further area as may be specified by Government Notice, owning or in charge of cattle shall, upon the death or slaughter because of disease, suspected disease, or accident, of any such cattle, immediately report such occurrence through the nearest Cattle Inspector, Native Commissioner or Police Officer to the District Veterinary Surgeon.

15. Notwithstanding the provisions of these regulations, it shall be competent for the Chief Inspector of Cattle to authorise and direct the movement of cattle for the purposes of isolating, dipping, quarantine, or any other such objects as may be deemed necessary to prevent or suppress an outbreak of disease.

16. Whenever an area shall have been declared an area of infection or guard area in terms of section 12 hereof, any person who shall allow any cattle to stray or be otherwise removed, except as provided for in these regulations, from any one place within such area to another place, or from a place outside of to a place within such area, shall be guilty of an offence against these regulations.

17. All cattle within the limits of the various commonages and townlands, areas of infection and guard areas as declared under section 12 hereof, or depastured on common grazing ground, shall be dipped or sprayed at least once in every three days, unless the Chief Inspector shall authorise the extension of the time between such dipping or spraying, or the entire suspension of the same.

18. In all areas of infection and guard areas sheep and goats shall be dipped at such periods as may be directed by the Chief Inspector.

19. Whenever the owner, occupier, or manager of a farm shall adopt means of cleansing cattle running thereon, either by spraying, dipping, or by any other method, the Chief Inspector may order any natives or other persons having cattle on the same farm to cleanse such cattle, and the Native Commissioner of the district within which the farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed upon between the said owner, occupier or manager and the said native owners.

20. All permits for the removal of cattle issued under the provisions of the said Ordinance or of any regulations framed thereunder shall specify legibly and clearly on the face thereof the place from and to which such cattle may be removed, the route by which they shall travel, the number and brands of such cattle, the time allowed for the journey, and such other particulars and conditions as it may be deemed expedient to provide.

21. No permit issued for the movement of cattle shall be taken to authorise any trespass in connection with such movement.

22. Notwithstanding the provisions of these regulations, it shall not be lawful for any owner of cattle to allow any such cattle to be on any road, public outspan, commonage, or any property other than that of the owner,

unless they are free from ticks or unless they have been effectively cleansed by dipping, spraying or other process, within fourteen days of being allowed on such road or other place. Any beast having ten or more ticks on it shall not be considered free from ticks.

23. Any person contravening the provisions of these regulations or the conditions set out in permits issued thereunder, shall, where no higher penalty has been by the said Ordinance or any other law provided, be liable in respect of each offence to a fine not exceeding £20, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months.

SCHEDULE "A."

Veterinary Districts of Southern Rhodesia.

(1) *Salisbury.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

32. Battlefields; 33. Hartley and Gatooma; 34. Gadzema Station; 35. Makwiro Station; 36. Norton Siding; 37. Hunyani Tank; 38. 1645½ Peg B. & M. & R. Railways; 39. Salisbury A.; 40. Salisbury B.; 41. Salisbury C.; 42. Salisbury D.; 43. Arcturus; 44. Bromley; 45. Marandellas North; 46. Marandellas South; 48. Headlands Station; 49. Junction Mazoe and Lomagundi Railways; 50. 23-Mile Peg, Lomagundi Railway; 51. Passaford Station; 52. 35-Mile Peg, Lomagundi Railway; 53. Gwibi Tank Halt; 54. Banket, Lomagundi; 55. Eldorado, Lomagundi; 56. Selby Siding; 57. Mazoe; and 58. Kimberley Reefs.

(2) *Bulawayo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

1. Plumtree; 2. Marula Siding; 3. Figtree; 4. Westacre Junction; 5. Bulawayo Area; 6. Heaney Junction; 7. Bembesi Station; 8. Insiza North; 9. Insiza South; 10. Shangani North; 11. Shangani South; 14. Redbank; 15. Nyamandhlovu Station; 16. Malindi Station; 17. Wankies Area; 18. Matetsi Siding; 19. Matopo Terminus; 20. Sabiwa Siding; 21. Gwanda Station; 22. West Nicholson; 23. Belingwe; 59. Essexvale and Balla Balla Areas; 60. Stanmore Siding Area; 61. Filabusi Area.

(3) *Gwelo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

12. Somabula Siding; 13. Gwelo Station; 24. Selukwe Area; 25. Surprise Area; 26. Indiva Siding; 27. Lalapanzi; 28. Iron Mine Hill Siding; 29. Umvuma Siding; 31. Que Que Station.

(4) *Umtali.*

An area comprising the native districts of Umtali, Melsetter, Makoni and Inyanga.

No. 247 of 1915.] [23rd July, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notices Nos. 526 of 1914, 167, 175 and 179 of 1915, and in terms of section 12 of Government Notice No. 50 of 1912, declare the following to be areas of infection and guard areas :—

2. Umtali Native District.

(b) *Guard Area.*

The farms N'odzi and Nyagari and the Penhalonga Valley.

3. Melsetter Native District.

(a) *Areas of Infection.*

(1) Highlands, Rockwood and Joppa Farms.
(2) Clearwater, Nooitgedacht, Randfontein and Avontuur Farms.
(3) Enhoek, Ravenswood, Roslyn, Woodstock, Landsdown, Heilrand and Kenilworth Farms.
(4) Wolvedraai Farm.
(5) Houtberg Farm.
(6) Springfield Farm.

(b) *Guard Area.*

That portion of the native district of Melsetter south of the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri and the Nayanyadzi River.

No. 375 of 1915.] [15th October, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notice No. 194 of 1915 and section 1 of Government Notice No. 247 of 1915, and declare the following areas of infection and guard area in lieu thereof :—

1. Salisbury and Mazoe Native Districts.

(a) *Areas of Infection.*

(1) M.T.C., Gallagher's Lease, Makabusi, Epworth, Adelaide and Glenwood farms.

(2) Sternblick farm.

(3) Bluff Hill farm.

(4) Sigaro farm.

(5) Mabelreign farm.

(6) Borrowdale Estate, Helenvale, Glen Lorne, Luna and Greystone farms.

(7) An area bounded by and including the following farms :—Belford Estate, Belford Estate No. 2, Belford Estate North, vacant land on which the Jumbo Mine is situated, Whitfield, Yarrowdale, 100-acre lots, vacant land, Tjibakwe and Belford Estate No. 3.

(b) *Guard Area.*

An area bounded by and including the following farms :—Bitton, Syston, The Lily, Killiemore, Penrose, Derry, Glen Lussa, Rainham, Gillingham, Park Ridge, Crowborough, Lochinvar, eastern sub-division of Willowvale, Glen Norah, Hopley, Saturday Retreat, Reserve, Odar, Stoneridge, Eyrecourt, Boutelle, Twentydales, Nalire Reserve, Mayfair, Galway Estate, Sebastopol, Gardiner, Father Hartmann's farm, Chishawasha, The Crag, Umritsur, Mount Shannon, Halstead, Chindamora Reserve, Pote, Valeria, Spelonken, Arnold's, Smithfield, Brundret, Spitzkop, Summerdale, Rockwood, Somerset, Southmoor, Howick Estate, Leeuw's Rust, Klein Kopjes, Oude Kraal, Mooi Leegte, and Reserve.

No. 283 of 1915.] [20th August, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the following area of infection and guard areas :—

(a) *Area of Infection.*

The farm Quagga's Hoek, in the native district of Melsetter.

(b) *Guard Areas.*

(1) That portion of the native district of Melsetter north of and including the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri and the Nyanyadzi River.

(2) That portion of the native district of Umtali lying south of the Impodsi River from its junction with the Odzi River to its junction with the Shetora River, thence up the Shetora River to the farm Butler North and including that farm and Banti North.

No. 393 of 1915.] [29th October, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the farm Carrickcreagh, in the native district of Salisbury, to be an area of infection.

No. 394 of 1915.] [29th October, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the following areas of infection :—

(1) Melsetter native district—the farms Rumble Rills, Groenvlei, Cecilton and Quagga's Hoek.

(2) Umtali native district—the farm Penkridge.

No. 66 of 1916.] [25th February, 1916.

AFRICAN COAST FEVER.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Animals Diseases Consolidation Ordinance, 1904," to declare, in terms of section 12 of Government Notice No. 50 of 1912, the following areas of infection in the native district of Melsetter :—

The farms Grass Flats, Moosgwe, Lombard's Rust and Diepfontein.

No. 438 of 1915.] [26th November, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the farm Ostend, in the native district of Melsetter, to be an area of infection.

No. 381 of 1914.] [3rd September, 1914.

COMPULSORY DIPPING.

UNDER and by virtue of the powers vested in me by section 7 of the "Compulsory Dipping Ordinance, 1914," I hereby declare that the provisions of that Ordinance shall be applied in respect of cattle within the following areas from the date of issue of this Notice, dipping to take place at such intervals as the Chief Veterinary Surgeon shall direct.

The areas under the control of the Municipalities of Salisbury, Bulawayo, Gwelo and Umtali, the Sanitary Boards at Gatooma and Victoria, and the Village Management Boards at Que Que, Melsetter, Penhalonga, Marandellas, Hartley, Enkeldoorn, Avondale, Umvuma, Selukwe and Gwanda.

Further, I do hereby declare that a charge of one penny per head will be made in respect of all cattle dipped at Government dipping tanks, except unweaned calves, for which no charge will be made; and one penny in respect of all horses, mules and donkeys, and ½d. in respect of all sheep.

No. 70 of 1915.] [4th March, 1915.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notice No. 353 of 1913 and declare that within the area defined below, after date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

An area including parts of the native districts of Bulawayo, Umzingwane, Matopo, Bubi and Bulalima-Mangwe, bounded by and including the following farms:—

Lochard Block, Greenlands, Wessels, Allendale B, Oscardale, St. Ninian's, Fincham's, Inyati Reserve, Lortondale, Wynslay Estate, Greville, that portion of unalienated land lying south of a line drawn from the most westerly beacon of Dollar Block and the north-eastern beacon of Killegar, Killegar, Braemar Block, Portive, Robert Block, Induna, Waterfall, Dingaan, Rouxdale, Fundisi, Umkein, Seaborough, Devonby, Helenvale, Slight's, Billar's, Craiglee, Bluebonny, Ireland, Welcome, Paul's Rest, McGeer's Luck, Centenary Mission, Maritzburg, Springvale, Outspan No. 3, Tati Road, De Hoop, Anglesea, Mineral King, World's View, Matopo Block, Brethren in Christ Mission Farm, Absent, the unsurveyed land lying north of a line drawn from the south-east beacon of Absent to the south-west beacon of The Range, The Range, Clark's, Swaithe's, Limerick, Pioneer's Rest, Mayhill, Rietfontein, Bradford, Hamilton, Mayfair, York, Indina, Rathline, Westondale, sub-division A of Fochabers, Fochabers, Kodhwayo, Zimbile and Lochard Outspan.

No. 206 of 1915.] [25th June, 1915.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that within the area defined below, on and after the date of publication

hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

All surveyed farms in the native district of Melsetter south of the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge and Biriwiri, including the Ingorima Reserves and Mafusi Reserve, and excluding the farms Umzelezwe, Nyagadzi, Mhungura, Pangela, Passage, Mangani, Chengwe, Gumera, Umbugu, Nhori, Elongwe and Mamzwera.

No. 318 of 1915.] [3rd September, 1915.

AFRICAN COAST FEVER. COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that within the area defined below, on and after the date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

That portion of the native district of Melsetter north of and including the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri, and the Nyanyadzi River; and that portion of the native district of Umtali lying south of the Impodsi River from its junction with the Odzi River to its junction with the Shetora River, thence up the Shetora River to the farm Butler North and including that farm and Banti North.

No. 355 of 1915.] [1st October, 1915.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notice No. 527 of 1914, and declare that within the area defined below, on and after date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

An area in the Salisbury and Mazoe native districts bounded by and including the following farms:—Lilfordia, Saffron Waldon, Kilworth, Porta, Reserve, Clement's Plot, Warwickshire, Oatlands, Amalinda, The Rest, Langford, Saturday Retreat, Reserve, Odar, Stoneridge, Longlands, Seki Native Reserve, Dunstan Estate, Banana Grove, Mayfair, Galway Estate, Sebastopol, Gardiner, Gilnockie, Cromlet, Learig, Reserve, Meadows, Mount Shannon, Halstead, western portion of Chindamora Reserve, Pote, Valeria, Spelonken, Arnold's, Smithfield, Brundret, Spitzkop, Summerdale, Rockwood, Somerset, Southmoor, Howick Estate, Leeuw's Rust, Klein Kopjes, Oude Kraal, Mooi Leegte, Reserve, Bitton, Syston, The Lily and Killiemore.

No. 402 of 1915.] [5th November, 1915.

COMPULSORY DIPPING OF CATTLE: ENTERPRISE SECTION OF SALISBURY NATIVE DISTRICT.

UNDER and by virtue of the powers vested in me by section 2 of the "Compulsory Dipping Ordinance, 1914," I do hereby declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

Description of Area.

An area bounded by and including the following farms:—Halstead, Mount Shannon, The Meadows, Ivordale, Ivanhoe, Oribi, Colga, Neptune, Mashona Kop, Mashona Vlei, Vuta, Chinyika, Lonely Park, Grazeley, Guernsey, adjoining vacant ground, Cromlet, Father Hartmann, Chishawasha, Stuhm, The Springs, The Grove and Umritsur.

No. 423 of 1915.] [19th November, 1915.

COMPULSORY DIPPING OF CATTLE: MELSETTER AND UMTALI DISTRICTS.

UNDER and by virtue of the powers vested in me by section 2 of the "Compulsory Dipping Ordinance, 1914," I do hereby declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

Description of Area.

All surveyed farms and the Ingorima and Mafusi reserves, in the native district of Melsetter, excluding Umzelezwe, Nyagadzi, Mhunguru, Pangela, Passage, Mangani, Chengwe, Gumera, Umbugu, Nhori, Elongwe and Mamzwera; and including the following farms in the native district of Umtali: Tom's Hope West, Steynstroom, Thabanchu, Penkridge, Macandrews, Cronley and Lisnacloon.

No. 21 of 1916.] [21st January, 1916.

COMPULSORY DIPPING OF CATTLE: SALISBURY, MAZOE AND HARTLEY DISTRICTS.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," to declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

Description of Area.

An area bounded by and including the following farms:—St. Mary's, Stoneridge, Odar, Reserve, Saturday Retreat, Chizanza, Snum Cuique, Arbroath, Langford, The Rest, Amalinda, Oatlands, Warwickshire, Clement's Plot, Reserve, Porta, Lyndhurst, Riverside, Herren Hausen, Lilfordia, Kilniemore, The Lily, Ballineety, Fairview, Spa, Passaford, Springvale, Mbebi, Umsasa, Great B, Christon Bank, St. Gerera, Willesden Farm, Borrowdale Estate, Luna, Glen Lorne, Gletwyn, Sternblick, Manresa, Caledonia, Sebastopol, Galway Estate, Mayfair, Nalire Reserve, Buena Vista and Seki Reserve.

No. 22 of 1916.] [21st January, 1916.

COMPULSORY DIPPING OF CATTLE: MAKWIRO AREA, HARTLEY DISTRICT.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," to declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

Description of Area.

An area bounded by and including the following farms:—Umfulia, Dorothy Hill, vacant land, Seigneury Reserve, Zimbo Junction, Serui Drift, Strathmore, Scotsdale, Cape Boys' Reserve, Railway Farm No. 22, vacant land between Railway Farm No. 21 and Spencer, Spencer, Railway Farm No. 23, Woodsgift, Railway Farm No. 25, Southwood, Northwood, Niklot, Rothwell Extension, Hunyani Estate, Hunyani Estate No. 2, Stanhope, Cromdale, Garthnor, Serui, Curlewood, Cotswold and vacant land and farms lying within a line from the most easterly beacon of Cotswold to the north-east beacon of Fort Martin, thence to the south-east beacon of Fort Martin and from there due south to the Umfuli River and down that river to the farm Umfulia.

No. 98 of 1916.] [17th March, 1916.

COMPULSORY DIPPING OF CATTLE: MARANDELLAS AND SALISBURY DISTRICTS.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," to declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

Description of Area.

An area bounded by and including the following farms:—Rakodsi, Longlands, Shepparton (portion of Lendy Estate), Progress, Rockery, Shortlands, Rastenburg, Loquat Grove, Cornwall, Norfolk, Middlesex, Kent, Suffolk, Sussex, Rupture, Argosy, Weir, Inandu, Seaton, Rapture, Sunny Fountains, Mangwendi Mission, Retreat and Springvale.

No. 337 of 1915.] [17th September, 1915.

ENZOOTIC ABORTION.

IT is hereby notified for public information that nothing contained in the several Government Notices declaring certain areas to be actively infected with the disease known as enzootic abortion, for the purposes of the "Animals Diseases Consolidation Ordinance, 1904," and the "Animals Diseases Amending Ordinance, 1911," shall be taken to prohibit the movement of oxen to, from or through such areas, subject to compliance with the laws and regulations governing the movement of cattle.

No. 186 of 1914.] [23rd April, 1914.

IMPORTATION OF CATTLE.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel the regulations published under Government Notice No. 128 of 1914, and make the following provisions in lieu thereof:—

1. The importation of cattle will be permitted from the Cape Province, the Orange Free State and the Transvaal on the following terms and conditions :—

(1) A permit shall be required from the Chief Inspector, which may contain such conditions as shall from time to time appear expedient.

(2) The importation of cattle with more than two permanent central incisor teeth shall not be permitted, except that animals entered in the South African Stud Book or the appendix thereto, with not more than the first and second pairs of permanent incisors, may be imported.

(3) Applications for permission to import shall be in the form "A" attached hereto, and accompanied by a declaration in the annexed form "B."

(4) All importations shall be by rail, and for the purposes of importation, Bulawayo shall be the port of entry.

(5) All cattle imported in terms of these regulations shall, on arrival at Bulawayo, Salisbury or Umtali, be submitted to such examination or tests as the Chief Inspector may direct. If such examination or tests disclose the existence of any destructive disease, the cattle shall be immediately destroyed and the carcases thereof disposed of in such a manner as a Government Veterinary Surgeon may authorise or require. The Chief Inspector may permit of the age restriction and the tests aforesaid being dispensed with in the case of cattle in transit by rail to any place beyond the borders of Southern Rhodesia.

(6) All expenses or losses incident to quarantine, examination, testing or destruction as aforesaid shall be borne by the owner of the cattle.

2. The importation of cattle from the United Kingdom of Great Britain and Ireland, the United States of America, the Kingdom of the Netherlands and Germany will be permitted under the following terms and conditions :—

(1) Importation shall be through and direct from the ports of Cape Town or Port Elizabeth, and there shall be a consignment note or other satisfactory evidence that cattle so imported have come direct from one of the above-mentioned countries.

(2) The provisions of sub-sections (1), (5) and (6) of section 1 hereof shall apply to importations in terms of this section.

3. Any person introducing cattle in contravention of these Regulations, or failing to comply with any of the conditions attached to permits to import, or furnishing applications, declarations, or other necessary documents known to be false in any material particular, or failing to comply with all lawful directions as to quarantine, examination, testing, destruction or disposal of carcases, shall be liable to a fine not exceeding £20 for each animal in respect of which such offence shall have been committed, and in default of payment to imprisonment with or without hard labour for any period not exceeding six months, unless higher or greater penalties shall have been provided for such offences by the "Animals Diseases Consolidation Ordinance, 1904"; provided, however, that the penalties imposed by these Regulations shall not exempt any cattle from destruction in terms of the aforesaid Ordinance.

ANNEXURE "A."

APPLICATION FOR CATTLE IMPORTATION PERMIT.

1. Applicant's Name and Address.....
2. Number and Class of Cattle to be imported.....
3. Area or Farm and District where Cattle are at present located.....
.....
4. Area or Farm and District to which Cattle are to be moved.....
.....

Applicant's Signature.....

Date.....
Application.....
Permit No.....

ANNEXURE "B."

I, ... residing on the farm ..... in the district of ..... do solemnly and sincerely declare that the ..... (number in writing) animals also enumerated below have been in my possession since birth, and that Lungsickness (Contagious Pleuro-Pneumonia) has not existed amongst any of my cattle, nor on my farm, during the last four years, and that these animals have never been exposed for sale in any public market or stock fair.

Number of Animals ..... Bulls ..... Heifers .....

Breed .....

Seller's Name and Address .....

.....

Purchaser's Name .....

Place in Southern Rhodesia to which animals are being sent

.....

And I make this solemn declaration conscientiously believing the same to be true.

....

Declared to at ..... on this ..... day of..... before me,

.....

Resident Magistrate for the District of .....

IMPORTATION OF STOCK FROM THE PROVINCE OF THE CAPE OF GOOD HOPE.

WITH reference to Departmental Notice of 28th February, 1912, it is hereby notified that the said Notice is cancelled, and importation of stock will now be permitted, in terms of Government Notice No. 110 of 1908, from the Province of the Cape of Good Hope, with the exception of the following districts :—

Komgha
East London
Peddie
Victoria East
Kingwilliamstown
Stutterheim
Cathcart
Stockenstroom
Queenstown (Gwatyu Ward only)
Glen Grey
Maclear
Elliot Slang River
Wodehouse
Barkly East

No. 364 of 1914.] [27th August, 1914.

REGULATIONS GOVERNING IMPORTATION OF LIVE STOCK, Etc.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended from time to time, I do hereby cancel the regulations published under Government Notices Nos.

295 and 394 of 1908; 38, 61 and 263 of 1909; and 60 of 1911 and 188 of 1912, 47 of 1913, and so much of any other regulations as may be repugnant to or inconsistent with the subjoined regulations, which are hereby declared to be of full force and effect.

1. The importation of the following animals from the respective countries or districts enumerated is prohibited, owing to the existence or supposed existence of destructive diseases affecting the said animals in the said countries :—

(1) All animals and dogs as defined by the aforesaid Ordinance from—

India,
Mauritius,
Persia,
British Burmah,
Assam,
China and bordering countries, including Korea,
French Indo-China,
Dutch East Indies,
Hong-Kong,
Federal Malay States,
The Philippines,
Zanzibar,

and all other countries where surra is known or suspected to exist.

(2) Pigs from the Union of South Africa, the Bechuanaland Protectorate, the Tati Concession, and other countries in which swine fever exists or is suspected to exist, subject, however, to the exceptions contained in the proviso to this section.

(3) Dogs from the territories of Northern Rhodesia and Portuguese East Africa, subject, however, to the exceptions in the proviso of this section.

(4) Sheep and goats from the districts of Albany, Alexandria, Bathurst, Bedford, East London, Fort Beaufort, Humansdorp, Jansenville, Kingwilliamstown, Komgha, Peddie, Somerset East, Stockenstroom, Uitenhage and Victoria East, in the Cape Province; the districts of Barberton, Lydenburg, Marico, Pretoria, Rustenburg, Waterberg and Zoutpansberg, in the Transvaal; Swaziland, Portuguese East Africa, Northern Rhodesia.

Provided, however—

(a) that the Chief Inspector may at his discretion permit the importation of pigs, sheep and goats from the above-mentioned places on production of a certificate signed by a duly authorised Government Veterinary Officer in the form of Schedule "A" attached hereto;

(b) that the importation of dogs required for scientific purposes only may be permitted from the places mentioned in sub-section (3) hereof, by the Chief Inspector, in writing, subject to such conditions as may be imposed by him;

(c) that dogs, sheep, goats and pigs from countries from which importation is permitted may be introduced *via* the port of Beira, provided that all such animals shall be transferred directly after disembarkation to the railway trucks at Beira, and conveyed thence to Umtali without leaving the said trucks.

2. The areas set out in Schedule "B" hereto are hereby appointed for the depasturing and quarantining of animals for slaughter in connection with the places therein mentioned.

3. The several districts of Southern Rhodesia are hereby declared to be an area infected with scab amongst sheep and goats, and the movement of all sheep and goats from any farm to beyond the limits thereof, or from their usual grazing ground within the limits of any town lands or native

reserves to any other place, is prohibited, except under the written permit of an Inspector or Sub-Inspector. Such permit shall set forth the number and description of animals to be moved, the route they shall travel, and the period for which the permit shall be in force. In cases where it may be necessary or desirable, the person to whom such permit is issued may be required to cause the animals referred to therein to be dipped before being moved.

4. The introduction of sheep and goats is prohibited except—

(a) as specially provided for by section 1 hereof;

(b) from places not mentioned in section 1, if accompanied by a certificate in the form set out in Schedule "C" hereof.

5. The owner or person in charge of any horse, mule or donkey entering Southern Rhodesia by rail shall immediately report such arrival to the Veterinary Office at Salisbury, Bulawayo and Umtali respectively, and no such animal shall be detrained at any intermediate station without the written authority of a Government Veterinary Surgeon.

6. The owner or person in charge of any horse, mule or donkey entering Southern Rhodesia by road shall immediately report such arrival at the Police Camp nearest to the place where such entry is made, and the officer in charge of such Police Camp shall immediately report to the Veterinary Department, which shall direct what steps are to be taken to test such animals with mallein, as in the following clause provided.

7. All horses, mules and donkeys, upon entering Southern Rhodesia, shall be tested with mallein, and the owner or person in charge of such animals shall in all respects carry out the lawful directions of the Inspector while such animals are being tested: provided that this regulation shall not apply to animals in transit through Southern Rhodesia which are not detrained *en route*.

8. Horses, mules and donkeys lawfully in this Territory, and required for purposes necessitating frequent crossing of the border, may be allowed to so cross on such terms as to registration, branding, testing and conditions as the Chief Veterinary Surgeon may from time to time deem expedient to prescribe.

9. An Inspector may direct the thorough cleansing and disinfecting of trucks which may be reasonably suspected of being sources of infection of any destructive disease, and may direct the destruction of truck fittings, fodder, excreta, or other matter or thing which may be reasonably calculated to convey such infection.

10. Any persons contravening the provisions of these regulations, or the instructions or directions given in terms of these regulations, shall be liable in respect of each offence to a penalty not exceeding twenty pounds, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months, unless where more or heavier penalties have by the aforesaid Ordinance, or by other regulations framed thereunder, been expressly provided.

SCHEDULE "A."

Certificate.

Issued under provisions of section 1, Government Notice No. 364 of 1914.

This is to certify that the animals enumerated below are, in my opinion, free from any destructive disease, including heartwater; and, to the best of my knowledge and belief, have not been in contact with any infected animals,

nor come from, or through, a locality where any such disease is known to exist or has existed for twelve months from date hereof.

Date....., 19...

Place .....

.....

Signature of
Government Veterinary Surgeon.

Number and general description of animals :

.....Pigs, ...Sheep, ...Goats.

Place from which animals are to be sent :

.....

Owner's name and address :

.....

.....

Place in Southern Rhodesia to which it is desired to send the animals .....

SCHEDULE "B."

Description of areas set apart for depasturing and quarantining of animals for slaughter.

Salisbury.—A fenced piece of land, 400 acres in extent, situated on the Makabusi River below Maggio's plot, within the Salisbury commonage and towards the southern boundary thereof.

Bulawayo.—That piece of fenced land situated on the Bulawayo commonage between the railway line, to the south, and the Solusi road, adjoining and to the south-west of the Government dipping tank, in extent 1,000 acres more or less.

Gwelo.—Starting from a point where the Ingwania road crosses the railway, along this road past the sanitary stables to a point a quarter of a mile west, thence in a line parallel with the railway to the Gwelo River, thence along the river to the commonage beacon No. 11, thence in a straight line to the Shamrock road where it is intersected by the Scout's Spruit, thence along the Shamrock road to where it joins the Main Street extension, thence along this to the railway line, and down this to the starting point.

Umtali.—A piece of fenced land situated on the old Darlington Farm section of the Umtali commonage.

Penhalonga.—A piece of fenced land situated on plot No. 2, Imbeza plots.

Selukwe.—A piece of fenced land, in extent about 300 acres, situated on the farm Sebanga and adjacent to the township of Selukwe.

SCHEDULE "C."

I, ... residing at .....

in the district of... ..... in the.....

Colony, do solemnly and sincerely declare that the animals enumerated below are free from any contagious disease, including scab, and have not been in contact with any infected animals within six months from date hereof, and that, to the best of my knowledge and belief, such animals, in

travelling to.....† station, will not come in contact with any animals amongst which scab or any other contagious disease exists.

And I make this solemn declaration conscientiously believing the same to be true.

.....

Declared to at.....on this.....

day of.....before me.

.....

Magistrate, Government Veterinary Surgeon, Scab Inspector, or Police Officer of district from which animals are being sent.

Number and general description of animals being sent.....

Owner's name and address.....

.....

Place in Southern Rhodesia to which animals are being sent.....

† Station within Colony of origin.

No. 442 of 1914.] [15th October, 1914.

ISSUE OF PERMITS FOR THE REMOVAL OF STOCK.

IT is hereby notified for public information that His Honour the Administrator has approved of members of the British South Africa Police issuing permits for the removal of cattle, sheep and goats at the undermentioned stations when no Inspector or Sub-Inspector of Cattle is available :—

Nyamandhlovu.	Mphoeng's.
Gwanda.	Holi.
Plumtree.	Filabusi.
Fort Rixon.	Gwaai.
Belingwe.	Figtree.
Inyati.	Umvuma.
Fort Usher.	Que Que.

No. 410 of 1915.] [12th November, 1915.

ISSUE OF PERMITS FOR REMOVAL OF STOCK.

IT is hereby notified for public information that His Honour the Administrator has approved of members of the British South Africa Police issuing permits for the removal of cattle, sheep and goats at the undermentioned stations when no Inspector or Sub-Inspector of Cattle is available :—

Mazunga.	Tuli.
Makwiro.	Sinoia.
Banket Junction.	Buhera.
Makaha.	

No. 12 of 1916.] [14th January, 1916.

ISSUE OF PERMITS FOR REMOVAL OF STOCK.

IT is hereby notified that His Honour the Administrator has approved of members of the British South Africa Police issuing permits for the removal of cattle, sheep and goats at the Beatrice Mine.

No. 375 of 1912.] [28th November, 1912

IMPORTATION OF POULTRY.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended by the "Animals Diseases Amendment Ordinance, 1910," I do hereby declare and make known that the following regulations shall be in force and effect from date of publication hereof :—

(1) All poultry imported by rail shall be inspected by an Inspector or Sub-Inspector at Plumtree, Bulawayo or Umtali.

(2) Should any consignment of poultry shew symptoms of disease, or should such Inspector or Sub-Inspector have reason to believe that any disease exists in, or that infection is likely to be conveyed by such consignment, he may order the detention and isolation of the whole consignment for such period as he may deem necessary.

(3) The Chief Inspector may order the destruction of all poultry which he has reasonable grounds for believing to be diseased or likely to convey infection.

THE following extract from Live Stock Regulations, printed on page 150 of the South African Railways Official Tariff Book, is published for general guidance :—

Poultry are not accepted by rail unless they are placed in a crate and the following conditions are complied with :—

(1) The size of the crate shall be 3 feet 6 inches by 2 feet 9 inches external floor dimensions; for turkeys and geese the height shall be 30 inches; and for fowls, ducks, and poultry of a like size, the height shall be 20 inches.

(2) Each crate must contain two drinking vessels filled with pure water, such vessels to be not less than five inches in depth, of the unspillable type, one being fixed at opposite corners of the coop.

(3) Each crate shall contain two receptacles for food of a suitable size, filled with suitable food other than whole maize.

(4) The birds must not be over-crowded in the crates, and in no case must there be more than 20 fowls, ducks or other birds of a like size, or ten turkeys or geese

(5) Different species of birds must not be placed in the same coop.

Unless coops, crates, and the like are strong enough to bear ordinary transit handling, the Administration will not accept responsibility for loss.

No. 505 of 1914.] [10th December, 1914.

CLOSING OF GATES ON ROADS, ETC.

UNDER and by virtue of the powers vested in me by section 26 of the "Fencing Ordinance, 1904," I do hereby provide that travellers passing through a gate erected on a public or private road in terms of section 25 of the said Ordinance, and omitting to close such gate after having passed through, shall be liable to a fine not exceeding £10, or in default of payment to imprisonment with or without hard labour for a period not exceeding one month.

No. 23 of 1916.] [21st January, 1916.

"FENCING ORDINANCE, 1904."

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Fencing Ordinance, 1904," to define the area as described hereunder to be a district for the purposes of the said Ordinance and in terms of sections 3 and 4 thereof to bring the provisions of Part I. of the said Ordinance into operation in the aforesaid district from date hereof.

Description of Area.

That portion of the native district of Mazoe bounded by and including the farms Selwood, Marston, Nan Terra, Retreat, Avoca, Nomansland, Glencairn, Vergenoeg and Caledon.

SUMMARY OF THE GAME LAWS.

Game is divided into three distinct classes, described as follows:—

(a) Birds and Small Buck.

(b) Bushbuck, Hartebeest, Impala, Lechwe, Pookoo, Roan and Sable Antelope, Sitatunga, Tsessebe, Waterbuck, and Wildebeest.

(c) Royal Game, which includes Eland, Elephant, Giraffe, Gemsbok, Hippopotamus, Inyala, Koodoo, Ostrich, Rhinoceros, Springbuck and Zebra.

The shooting season for Class "A" is as follows:—

In Mashonaland:
Birds from 1st May to 30th September
Small Buck from 1st May to 31st October.
In Matabeleland:
Birds and Small Buck from 1st May to 31st October.

To shoot in Class "A" a licence costing £1 per annum is required. This entitles holders to hunt in both Provinces during the open season.

Class "B."—The season opens on 1st July and closes on 30th November in both Provinces. The licence fee is £25 for non-residents and £5 for persons having their domicile in Southern Rhodesia. This licence entitles the holder to shoot up to 15 head, which number may be increased to a total of 25 upon payment of a further sum of £15 in the one case and £5 in the other.

Class "C."—The Administrator may, if he is satisfied that the animals are actually required for scientific purposes, grant to the holder of a game licence permission to shoot or capture any of the species included in this Class. Such permit requires a £5 stamp. Applications in writing, together with proof of *bona-fides*, should be addressed to the Director of Agriculture.

Game for Farming Purposes.—Permits may be granted for the capture of Eland, Ostrich, Zebra or other animals for the purposes of breeding or farming. Such permits require a stamp of the value of £1 and remain in force for six months. Application, accompanied by a sworn declaration, should be made through the Director of Agriculture or the Civil Commissioner of the district.

Game Injuring Crops.—The occupier of any cultivated land or any person acting under the authority of such occupier, may at any time destroy game actually doing damage on such land.

Export of Game.—No living Game or the Eggs of any Game Birds may be exported beyond the limits of Southern Rhodesia without a written permit.

Shooting on Private Land.—A licence does not entitle the holder thereof to shoot on private land without the permission of the land-owner.

Farmers Shooting Game on their Farms.—By taking out a special £1 licence, farmers may at any time shoot any game on their land. "Game" does not include any birds, except ostriches.

Open Area.—The shooting or capturing of all classes of game with the exception of ostriches and other birds classified as game is permitted within the following area in the Hartley district until further notice :—

Hartley District.—From the railway bridge on the Umfuli River, thence north-westwards along the Umfuli River to where it joins the Umniati River, thence southwards along the Umniati River to where it joins the Umsweswe River, thence eastwards along the Umsweswe River up to the drift at the Lydia Mine, thence along the old road from Lydia Mine to Etna Mine and to Inez Mine, thence northwards along the road from Inez Mine to Hartley, thence in the direction of the railway bridge to the starting point on the Umfuli River.

The game specified may be shot in this area without a licence.

Protected Area.—All game is strictly preserved in the Urungwe Game Sanctuary as defined below :—

An area in the Lomagundi district, bounded as follows : On the north and west by the River Zambesi, starting at the point where the Lozenzi River joins the Zambesi, and following the course of the latter river to its junction with the Sanyati River; on the east by an imaginary line drawn from the junction of the Indurune and the Nyaodsa Rivers to the head-waters of the Lozenzi River, and thence along the course of the Lozenzi River to its junction with the Zambesi River; on the south by an imaginary line drawn due west from the point of junction of the Indurune and Nyaodsa to the Sanyati River, thence along the course of this river to where it enters the Zambesi.

Game in Class "A" may be hunted in the close season until further notice on private land in the Melsetter district by holders of a licence.

"Locust Birds" are strictly protected, *vide* Government Notice No. 390 of 1912.

Elephants on Occupied Farms, Melsetter.—The destruction of Elephants when found on occupied farms on the High Veld in Melsetter District is authorised (*vide* Government Notice No. 284 of 1908).

Trespassing on native reserves, in pursuit of game or otherwise, is prohibited, except with the written permission of the Chief Native Commissioner.

Trypanosomiasis.—Persons in search of game in the southern part of the Sebungwe district are warned of the danger of hunting anywhere west of the Sengwe and Lutope Rivers within the fly area, and especially of proceeding anywhere within the valley of the Busi River.

No. 86 of 1916.] [10th March, 1916.

CANCELLATION OF OPEN SHOOTING AREA IN THE LOMAGUNDI DISTRICT.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Game Law Consolidation Ordinance, 1906," to cancel from date hereof Government Notice No. 273 of 1915, which suspended the operations of sections 9, 10 and 12 of the said Ordinance in respect of all game, with the exception of ostriches and other birds classified as game, within a certain area in the Lomagundi district.

No. 87 of 1916.] [10th March, 1916.

CANCELLATION OF OPEN SHOOTING AREA IN THE SEBUNGWE DISTRICT.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Game Law Consolidation Ordinance, 1906," to cancel from date hereof Government Notices Nos. 227 of 1913 and 312 of 1914, which suspended the operations of sections 9, 10 and 12 of the said Ordinance in respect of all game, with the exception of ostriches and other birds classified as game, within a certain area in the Sebungwe district.

No. 249 of 1908.] [27th August, 1908.

PROTECTION OF TREES.

IT is hereby notified for public information that any person who shall cut down for use as fuel, or for any other purposes than *bona-fide* farming, mining or manufacturing purposes, or cause to be so cut down the "Wild Westeria" (native name M'Pakwa or M'poea) tree, will be liable to prosecution for contravention of the provisions of the Forest and Herbage Preservation Act, 1859, and upon conviction to a fine not exceeding £100, or to imprisonment with or without hard labour for a term not exceeding six months, or to such fine and imprisonment, or to such imprisonment without a fine.

No. 163 of 1909.] [29th July, 1909.

ANY person who shall cut down or destroy, or cause to be cut down or destroyed, the "Shuma" or "Mashuma" tree, except under written authority from the Estates Office of the British South Africa Company, and subject to such conditions as may be imposed therein, will be liable to prosecution for contravention of the "Forest and Herbage Act, 1859," and, upon conviction, to a fine not exceeding £100, or to imprisonment, with or without hard labour, for a term not exceeding six months, or to such fine or imprisonment, or to such imprisonment without fine.

No. 44 of 1916.] [11th February, 1916.

APPLICATIONS FOR USE OF WATER

in terms of Chapter I. of the "Water Ordinance, 1913."

IT is hereby notified that the following applications have been made, in terms of the "Water Ordinance, 1913," for authority to use water :—

Name of applicant.	From what river.	Native district of	For the purpose of irrigating a certain portion or portions of the
R. H. Thackeray -	Umvindzi	Salisbury	Farm The Springs
W. Deall - -	Odzani	Umtali	,, Belford
P. Peech - -	Rumbavu	Salisbury	Estate Rumbavu Park

Any person or persons whose rights may be affected thereby are hereby called upon, in terms of the regulations published under Government Notice No. 439 of 1915, to lodge, within three months from the date hereof, at the office of the Water Registrar, Salisbury, from whom further particulars are obtainable, their objections (if any) to the granting of these applications, together with a full statement of the grounds for such objections.

Department of Posts and Telegraphs,

Southern Rhodesia.

Postal Notice No. 12 of 1913.

AGRICULTURAL PARCELS POST.

IT is hereby notified for public information that, on and after the 1st August, 1909, any article produced, and, if manufactured, produced and manufactured within Southern Rhodesia may be transmitted by Agricultural Parcels Post at the reduced rate of threepence per lb. or fraction thereof, up to a limit of eleven lbs. in weight.

The Agricultural Parcels Post is designed to bring the producer into direct communication with the consumer, and is available for the transmission of :—

Biscuits	Dried Meats	Plants
Bread	Eggs	Poultry
Butter	Flour	Seeds
Confectionery	Flowers	Sugar
Cigarettes	Honey	Tobacco
Dried & Bottled Fruits	Jam	Wool Samples

and other articles produced within Southern Rhodesia. It does not extend beyond the borders of Southern Rhodesia.

The senders of articles at the reduced tariff applicable to the Agricultural Parcels Post will be required to sign a declaration that the contents are the *bona fide* produce of Southern Rhodesia.

The limits of size and weight, and the general regulations, are those applicable to the Inland Parcels Post.

G. H. Eyre,
Postmaster General.

General Post Office, Salisbury,
31st March, 1913.

RHODESIA

Agricultural Journal.

ISSUED BY

The Department of Agriculture,

SALISBURY, RHODESIA.

ADVERTISEMENTS.

The Journal is issued every alternate month.

Application for advertising space should be addressed to the Editor. The rates are as follows, *per issue*:—

Position.	Whole page. £ s. d.	Half page. £ s. d.	Quarter page. £ s. d.
Inner pages - -	**2 0 0**	**1 5 0**	**0 15 0**
Outer cover (back) -	**4 0 0**	—	—
Inner covers (back and front) and page facing Contents	**3 0 0**	**1 15 0**	**1 0 0**

A discount of 10 per cent. will be allowed for standing or consecutive advertisements running through six issues. Remittances, and electros where desired, should accompany orders. The right is reserved to discontinue the insertion of standing or consecutive advertisements should payment beyond the second issue be delayed.

The right of approval of all advertisements by the Director of Agriculture is reserved, and his decision as to the acceptance or rejection is final.

An additional charge may be made for advertisements printed in special type, equal to any additional charges made by the printers for setting up same.

Advertisements will be accepted from *bona fide* farmers wishing to effect sale, purchase or exchange of produce, live stock or farm implements, at a minimum charge of 2/6 per insertion of 20 words. Extra words will be charged for at the rate of 1/- for every 10 words.

THE RHODESIA

Agricultural Journal.

Edited by the Director of Agriculture,
assisted by the Staff of the Agricultural Department.

PUBLISHED BI-MONTHLY.

VOL. XIII.—NO. 3.] JUNE, 1916. [5s. per annum.

Editorial.

Correspondence on subjects affecting the farming industry of Southern Rhodesia is invited. Enquiries will be replied to direct, or through the medium of the JOURNAL. *An interchange of ideas and suggestions between farmers will be particularly welcomed. Contributions of a suitable nature for insertion in this* JOURNAL *will be much appreciated. All communications regarding these matters, and advertisements, should be addressed to the Editor, Department of Agriculture, Salisbury.*

THIS SEASON'S SHOWS.—We think it may be taken as a satisfactory mark of progress that the number of agricultural shows held in Rhodesia is increasing year by year. This season the list comprises seven localities, and not the least pleasing feature is the success that attends those shows held in the really rural districts remote from the chief towns, which should be an encouragement to other farming centres to go and do likewise. The attraction of the agricultural show is not primarily the hope of winning prizes, though it is good that that should be a coveted honour. Rather is it the fact that an opportunity is given for farmers and all interested in farming to inspect the choicest products of a given district, to

compare them with one another and with the outputs of other districts, and thereby to learn the specialities and possibilities of all sections of the country. Districts and individual farmers are alike stirred to emulate the good results obtained by their neighbours, and commercial and other visitors are enabled to form a just opinion of the products of the country.

When this appears, the Bulawayo show will be over. The prize list is a long one, and the cattle section is very strong, including all the popular local breeds. There are several handsome special prizes given by the Society or its supporters. Liebig's present a cup for the best pen of five under three-year-old grade beef steers; Stewarts & Lloyds a cup for the champion cow or heifer. The chief interest at Bulawayo, however, will centre in the thousand guinea gold trophy for the champion bull of Rhodesia, and especially on the question as to whether it will be won again this year by a locally-bred animal.

The Gwelo show is being held on the 7th and 8th of June, and this list is also strong in cattle and live stock generally. We particularly welcome the special section devoted to farm seeds. Anything that has the effect of stimulating a study of the immense benefit to be derived from a sound system of seed selection is a step in the right direction.

The Hartley show is to be on the 12th and 13th of June. This district has always specialised in a large variety of crops, and we are glad to see that the prize list includes tobacco and fibres, as well as a special section for beans and peas. The cattle section is, of course, well represented, and there are special championship awards for the best bull and the best cow or heifer.

There will be shows at Victoria and Rusape on 16th June and 9th July respectively, but as we go to press no particulars are to hand.

The Umtali show will take place on the 13th and 14th of July, and a very good prize list has been issued. The live stock section is very full and attractive, but this show, as usual, is likely to be distinguished for the richness of its exhibits of tropical produce. There is a section for Rhodesian and Mozambique produce, and several items are there found that are not seen elsewhere, such as rubber, coffee, wattle bark, cut timber, cassava, etc. There is also a special cup, presented by Mr. J. Meikle, for competition between the various

Farmers' Associations. This is one of the most useful of all the competitions at any of our shows, and has a most stimulating effect upon the farmers of the competing districts. There are other special prizes, and we are glad to note a special dairy section.

The show in Salisbury will be held on the 27th and 28th of July. Here the inter-association competition again appears, and we hope it will be contested by a greater number of associations than hitherto. A special prize is offered in the needlework section. Pigs figure prominently under the live stock class, and no doubt this district is specially favoured in this respect by the presence in the town of the Bacon Factory, which acts as a stimulus to the progress of this industry. Particular attention may well be directed to the poultry section, under which a long list of special prizes is given, headed by a £25 cup for the best bird on the show. Mr. A. W. Partridge presents a £10 10s. cup for the best Rhodesian-bred bird in the light breeds, and Mr. H. S. Logan a cup of similar value for the best locally-bred bird in the heavy breeds. There are not less than twenty-three other special prizes in this section, which speaks volumes for the energy of the Poultry Association in working up their important industry. There are many classes for Rhodesian-bred birds as well as for cross-breds, specially included for the benefit of farmers, and it is hoped the offer of cups for eggs and trussed fowls will induce a very strong competition.

Here we should like to draw the attention of our readers to the advertisement, appearing in this issue, by the Witwatersrand Agricultural Society, which is holding its first annual pedigree stock sale and show of fat stock and maize and citrus fruit in Johannesburg on the 27th, 28th and 29th of September next. The Union Government has agreed to grant permits for slaughter oxen from Rhodesia for this occasion, and in the event of these cattle being sold for slaughter, there will be no detention through quarantine regulations. Over £1,600 is offered in prize money, and individual prizes range from £100 downwards. We believe that Rhodesia cannot be beaten in quality of maize and citrus fruit, and we hope that the handsome inducements offered will lead to this country being well represented at this show, where our products can be seen in competition with those of the Union.

THE WIDTH OF TYRES ORDINANCE.—The proposals regarding this matter, which have now been before the country for some little time, culminated in the passage through the Legislative Council of a measure which will have a far-reaching effect upon transport riders and farmers throughout the country. Pending the actual approval and promulgation of the law, it would be premature to discuss its provisions at length. A great variety of opinions has been expressed on the proposals, but these seem to have been successfully compromised or met in the Ordinance in its final form, which is calculated, without inflicting hardship on present owners of vehicles, to bring about gradually and steadily the use of such broad tyres as shall minimise the wear and tear on the roads of the country.

FERTILISERS AND THE WAR.—Mr. Holborow's article on this subject, which will be found on another page, deserves careful consideration by all farmers who are in the habit of using or propose to use artificial fertilisers. It has special reference to maize fertilisers, but the same conditions affect other classes of artificials. The position appears to be that certain elements essential for building up standard fertilisers are expensive and difficult to procure as a consequence of the war. The result will be that, for the coming season, it will be impossible for dealers to offer standard fertilisers at the old prices. It follows that, if a man succeeds in buying his supply of maize fertiliser with a guarantee that it contains the usual constituents in the usual proportions, he will certainly have to pay an enhanced price for it, and therefore he will not be able to count on the margin of profit from its use which he has usually been able to rely on. More than that, it will be an open question and one requiring careful calculation to ascertain whether or not there will be any profit at all. It is more than likely, however, that it will be impossible or difficult to obtain chemical fertilisers of the normal composition at any price. The question then arises, if the maize fertiliser, for instance, is modified in the manner illustrated by Mr. Holborow, will its effect upon the crop be such as to warrant its employment? Here a difficulty will confront the buyer. The chemist cannot tell him beforehand what will be the precise effect of the alteration in composition of a particular fertiliser.

When the chemist has analysed the exact contents of the mixture, he can say what he thinks will be its effect upon a soil and a crop, but he can state only the probabilities. Nothing but direct experiment can prove him to be correct or not, and in the nature of things that experiment cannot be made until next season, that is, too late to be of any assistance to the purchaser of fertilisers this year. The position is a difficult one, and we cannot dogmatise upon it, but we do advise caution.

Veterinary Research.—It will be good news to farmers to learn that it has been found possible to make provision on the estimates for the current year, in conjunction with certain loan funds for educational purposes, for an amount of £2,000 to be devoted to the extension of facilities for carrying on veterinary research. This is in addition to the normal amounts voted for that purpose. This item represents the beginning of a scheme which, though it may take several years to complete, will be proceeded with as fast and as far as funds permit; a scheme that should prove of material assistance in providing facilities for further investigation of problems connected with the ailments of live stock in Rhodesia.

Grass Burning.—Before this *Journal* appears again, the period of danger from veld fires will be upon us. Now is the time when precautions should be taken. Fire guards should be made before the grass is at its driest and fires are difficult to control. We have known farmers to be placed in a very precarious position as regards the pasturing of their stock in the later months of winter through neglect to provide against the contingency of fires started in their vicinity sweeping over their farms, and it is the part of wisdom to take time by the forelock. There seems to be an impression in some quarters that the law entirely prohibits the burning of grass. This is not so. Its aim is to penalise the promiscuous or malicious burning of the veld by natives or other irresponsible persons. But the burning of belts as a protection and the burning of selected areas by a man on his own farm are permitted, provided proper notice is given to neighbours and due care taken that such fires shall not get out of control and spread to the injury of other land owners.

Rhodesian Turkish Tobacco.—It is of the first importance that Rhodesian tobacco planters should realise that a good market exists for Rhodesian grown Turkish leaf of fair quality in the Union. It is even more important that they should understand that the markets of the whole Empire are open for this product, provided it is offered in proper condition and of fair quality. As a result of the war a unique opportunity will be given to all growers of Turkish leaf within the Empire to capture this trade, for it is quite safe to anticipate that a very effective preference, both sentimental and financial, will come into operation in favour of all British grown products as against those of our present enemies. In relation to articles, such as tobacco, which are normally subject to high duties, this preference is likely to be a heavy one. It is earnestly to be hoped that Rhodesian planters will not let this opportunity slip, but will, in spite of their past disappointments, have the foresight and courage to make a great effort to secure their share of this advantageous market. There can be no doubt that the prejudice against colonial grown Turkish leaf has disappeared, and manufacturers will be competing for such supplies as are available, so that prices should be good. On the other hand, if Rhodesian and other British planters fail to grasp the situation or neglect to make an effort to provide a substitute for the leaf grown in Turkey, then the manufacturers will be compelled to fall back on the products of our enemies. Hitherto Rhodesian Turkish tobacco has suffered owing to its being kept here after being baled, instead of being sent to the coast where climatic conditions are more favourable for proper maturing. This practice has been injurious to the trade, but there should be no difficulty in adopting the alternative course.

Potato Spraying Experiments.—Five years ago the Entomologist commenced a series of experiments "to determine whether, under the economic conditions prevailing here, it pays to spray for Early Blight," the only leaf disease of potatoes prevalent in the Territory. A preliminary report of results appeared in the *Agricultural Journal* for August, 1913, and a second report, covering the last three years' work, is published in this issue. Both reports shew that the effects of spraying are positive and profitable, and they also agree in demonstrating that the greatest profit is obtainable by the

application of seven sprayings at intervals of a week, as contrasted with fewer applications at longer intervals. The second series of experiments was differentiated from the first in two important factors that must not be overlooked in considering the results. In the earlier experiments, the varieties of potato treated were specially susceptible to the disease, namely, "Early Rose" and "Northern Star." In the later experiments a variety was chosen which is particularly resistant to the blight, namely "Up-to-Date." In the first series the ground was unmanured, in the second manure was freely used. These factors may have influenced the results, which are more favourable in the present than in the previous series of experiments. The cost of spraying is reckoned the same in both instances, namely, £3 10s. per acre for the seven sprayings at seven-day intervals, but it is noteworthy that the net profit per acre from spraying is actually higher in the 1916 report than in the 1913 report, in spite of the fact that in 1913 the crop was valued at 1½d. per lb., and in 1916 at only ¾d. per lb. The price was halved, but the increased yield more than doubled. The increase of marketable tubers was in the first case at the rate of 1,760 lbs., and in the second 3,772 lbs. per acre, valued respectively at £11 and £11 15s., the difference between which and £3 10s., the cost of spraying, being in the 1913 report shewn as £7 10s., and in the 1916 report as £8 5s. net profit. This large difference is doubtless due to some extent to the two factors differentiating the experiments above referred to. An increase of knowledge acquired in the period under consideration is also worth noting. In his preliminary report the Entomologist said "the general rule appears to be that the crop becomes severely blighted shortly after flowering." He is now able to speak specifically of the incidence of the pest when he says that "the very early crops in this Territory, which are planted about August and irrigated, suffer very little, and, in our experience, the disease takes a heavier toll the later the crop is planted. There appears to be no need to spray the early crop grown under irrigation, but all crops planted under the natural rainfall are liable to suffer heavily."

Planting Gum Trees.—On another page appears an article by Mr. Willoughby, who has charge of the Forestry

Nursery, in which he gives detailed instructions for the raising of gum trees from the seedling stage until they are planted out on the final site. He also gives descriptions of the better known varieties with illustrations to assist in identification, together with a brief account of their qualities for farm and commercial timber, and the situations for which they are severally suited. We hope this will be useful to farmers, and enable them to select for planting those varieties best adapted to their local conditions of soil, water and altitude. It should be pointed out that, although we publish directions for the raising of seedling trees, we think that, as a rule, it will pay a farmer better to procure his trees from a nursery where they have been properly hardened off and from which the trees are sent out at the right stage for planting. He will thus be saved considerable trouble and time, will have less blanks in his plantation and will probably secure greater uniformity in the growth of his trees.

Farm Pupils.—Although many young men who might otherwise be learning farming in Rhodesia are to-day engaged upon active service in one field or another of the war, yet there are some who, for one reason or another, are unable to take their part, and are anxious to acquire experience of matters pastoral and agricultural in this country prior to taking up farms. It has always been difficult to find openings for men so situated, and the Department of Agriculture is glad to learn of farmers prepared to take pupils on such terms as may be mutually arranged. To assist in meeting this need, arrangements exist whereby learners can be received at the Government Experiment Farm on the Gwebi, twenty miles from Salisbury, where they can gain a thorough insight into the various details of mixed farming as conducted there, and after a longer or shorter stay, take up farms for themselves elsewhere. No fees are charged, and quarters are provided, but pupils are required to make their own arrangements as to board, which can readily be done. During their stay they are expected to take part in all farm work going on under the direction of the manager. At present no systematic course of instruction can be given, but owing to the experimental nature of the work, very exceptional opportunities for acquiring practical knowledge exist.

Destruction of Wild Dogs.—It will no doubt be observed with satisfaction by farmers throughout the country that, even in these times of severe financial stringency, the Government has been able to renew in a measure rewards for the destruction of vermin. The sum voted by the Legislative Council, £250, is intended to be applied only to wild dogs, that form of wild carnivora which is the most destructive of all, yet which is perhaps least likely to be dealt with unless monetary inducements are offered. These voracious marauders do much damage and are difficult to destroy; besides which, running as they do in packs, the shooting of one or two does not end the trouble. It is anticipated that the reward of five shillings per head will encourage persons, and particularly natives, to destroy them, making it worth while to track them to their lairs and destroy the young litters before they become vagrant and dangerous. Attention is called to the Government Notice dealing with this subject on a later page.

The Late Mr. J. M. White.—It is with much regret we have to record the death of Mr. J. M. White, who for four years was in the service of the Agricultural Department as Government Veterinary Surgeon. He left Salisbury on the 25th March, 1915, on ordinary leave, and thereafter on special leave until the end of the war. Shortly after his arrival in England he joined the Army Veterinary Corps, and at the time of his death held a commission as lieutenant. Mr. White's work in Rhodesia was mostly in outside districts in connection with African Coast Fever control. He was a very efficient officer and popular with his colleagues. He was considered one of the most promising juniors on the staff, and his death is felt as a distinct loss. Lieutenant White died whilst serving in France, and his friends have the consolation of knowing that he willingly laid down his life in defence of that Empire upon the honour and integrity of which depends the fate of all its component parts, including Rhodesia, the home of his adoption.

Extracts from the Report of the Director of Agriculture

FOR THE YEAR 1915.

CONDITIONS OF AGRICULTURE.—The development of agriculture in Rhodesia during the past year has, of necessity, been affected by the conditions created by the war. Those conditions have been entirely adverse to progress, for the high war prices, which have benefited farmers in Britain, have in this country been more than counter-balanced by an excessive rise in sea freights. Therefore, in making any comparison with previous years, these unfavourable circumstances must be taken into account, and it is the more satisfactory to note that, despite retarding influences, there has been obvious expansion, beyond expectation, and the position generally is propitious.

In this report a new note will be observed in the frequent references to figures relating to farms, crops and stock. This is rendered possible by the establishment of a system of periodic collection of statistics from individual farmers, from which comprehensive figures relating to the various districts and to the country as a whole are compiled. The information so collected is of the greatest use in enabling us to gauge truly the magnitude and importance of the various branches of the farming industry, to measure our progress and take stock of the position from time to time, and frame forecasts for the future. A most pleasing feature in this new effort has been the whole-hearted support and ready co-operation accorded by the farming public in the compilation of the information.

Many farmers have gone to the front, and a few have left their farms derelict, sending their live stock elsewhere, but most have made some arrangement for the continuance of their operations, if on a restricted scale. A diminution in the number of working farmers in the country might have been anticipated, but happily this does not appear to be the case: in fact, a small increase is recorded, as the following figures shew, whilst the returns of five years ago are also given to shew the increase since then:—

	1910.	1914.	1915.
Mashonaland	990	1,139	1,151
Matabeleland	480	575	600
Southern Rhodesia ...	1,470	1,714	1,751

In many cases more than one farm is under the same ownership or management, so that if farms instead of farmers be counted, the figures are 1,421, 1,724 and 2,145 respectively. A large increase may confidently be looked for as soon as the war is over. Ready money has, of course, been scarce and sales limited; some of the weaker have gone to the wall, and a few cases of selling out have occurred—but singularly few, all things considered.

A satisfactory feature is the formation and growth of industries depending upon, associated with or beneficial to agriculture, notably the creamery, saw mills, carpentry, saddlery, oil factory, bacon factory and a cement factory, all of which are in a promising and active condition. Some are already operating on a considerable scale and beginning to afford a market—one of the chief needs of our farmers in Rhodesia to-day.

Live Stock.—The subjoined comparative statement gives the numbers of domestic live stock in the country as ascertained at the last census, and from the statistical returns of the past two years; it shews material increase in cattle and pigs, but a less satisfactory condition of affairs in respect of sheep and goats, which suffered severely during the phenomenally wet season of 1914-15:—

		1911 (Census).	1914 (Statistics).	1915 (Statistics).
Cattle:	European ...	164,167	341,878	394,866
	Native ...	299,756	406,180	446,060
	Total ...	463,923	748,058	840,926
Sheep:	European ...	58,341	67,238	50,222
	Native ...	234,031	257,006	261,593
	Total ...	292,372	324,244	311,815
Goats:	European ...	24,737	35,317	26,518
	Native ...	576,898	639,473	661,867
	Total ...	601,635	674,790	688,385

	1911 (Census).	1914 (Statistics).	1915 (Statistics).
Pigs: European ...	10,801	13,119	19,650

The cattle industry has grown greatly, in spite of the set-back on account of the war, and ranchers have increased their herds by local purchase and by the introduction of new blood from the Union and from overseas. An important and much disputed point is the rate of increase of cattle in Southern Rhodesia, and much depends upon an accurate determination of this point.

Increase in the number and quality of cattle is not the only advancement to be recorded. A great improvement has taken place in the general handling and management of animals, and the primitive method of herding and kraaling is gradually giving way to paddocking and hand-feeding. The practice of keeping cattle in good thriving condition in winter as well as in summer, with a view to early maturity, is being adopted more widely than hitherto, while the feeding of stock for the butcher on grain and fodder grown on the farm is beginning to receive attention.

The adoption of compulsory dipping by districts or groups of farmers is a new feature of much import. It indicates the growing realisation by the country of the beneficial effect of dipping, not only as a means of dealing with African Coast Fever, but as a successful preventive of other tick-borne disease, a protection from the direct loss of blood from the leech-like action of the tick, and the soundest stock insurance which the farmer can undertake. The permissive legislation passed in 1914, enabling dipping to be compulsorily applied wherever a majority favoured such a course, has already been widely utilised, and is likely soon to bring all occupied parts of the Territory within the shelter of its valuable protection. The following areas had during the year adopted the measure:—Enterprise, Salisbury, Makwiro, Melsetter, whilst others were taking steps to this end. The example given by these districts is spreading, and there is reason to anticipate considerable extension of this measure under the system of local option adopted.

On the principle of helping those who endeavour to help themselves, and in view of the exceptional conditions prevailing in the country at the present time, the Board of the British South Africa Company came to the assistance of farmers in

areas within which the Compulsory Dipping Ordinance has been made operative, granting loans on specially easy terms to such as are genuinely unable to find funds for the erection of dipping tanks, and thereby overcoming the only valid objection which could be offered to this useful measure. The Land Bank also has given assistance to a number of such cases. In several instances farmers' associations have constructed tanks at convenient centres for the joint use of their members, and in these cases the Government has granted loans recoverable through the charges made for dipping—a practical application of the methods of agricultural co-operation in the best sense. Where African Coast Fever exists, Government loans have also been made in terms of the law specially covering such cases. But without financial assistance from such sources a great many tanks have been built during the year, and we now possess 595 of these invaluable adjuncts to stock farming, or 1 to every 3.6 farms, a higher proportion, it is believed, than any other country, and an addition of 168 during the year. There is still room for improvement in this connection, as it is probably true to say that no other outlay on the farm in Rhodesia is to-day so expedient, profitable and necessary as a dipping tank.

As a direct consequence of the increasing capacity to supply our own requirements, we find a notable fall in the imports of meat. These can never be completely eliminated, for we have no local substitute for the Australian rabbit or other exotic specialities. The following Customs returns for the importation of meat of all sorts, excluding fish, are instructive:—

	lbs.	Value.
1910	2,844,212	£67,601
1911	2,241,199	£59,655
1912	1,705,405	£48,571
1913	1,275,555	£47,361
1914	1,530,610	£46,595
1915	728,508	£27,375

It is hoped that by the export of slaughter stock next year the balance of trade in commodities of this class may be put on the right side.

The health of live stock continues to be satisfactory on the whole. Despite the existence of a certain amount of

disease, numbers increase, casual mortality appears to be diminishing, and stockbreeders manifest their confidence in the position by expanding their undertakings and improving the character of their herds. African Coast Fever, though still in existence and difficult to eradicate, is no longer the menace it once was. Considerable losses have occurred, but only where, owing to ignorance or neglect, there has been undue delay in applying the measures which are known to be efficacious. The present outbreaks in parts of Mashonaland, however, are now all well under control, and Matabeleland continues to enjoy complete immunity. Other diseases are of much less account, and we are happily free from several which at present afflict neighbouring territories both to the north and the south. The exceptionally severe losses from horse-sickness unfortunately are still beyond human skill to prevent, although experimental investigation, both in the Union and in our own veterinary laboratories, is making progress towards protective inoculation against this plague. In other directions, too, such progress has been made in veterinary research as was possible under adverse conditions.

Crops.—The total acreage under the principal crops grown by European farmers in the season 1914-15 amounted to the very substantial figure of 183,407 acres. From information collected from the farmers, it is possible to give with approximate accuracy some definite idea of the position of the country with regard to the maize crop. The returns for maize grown by European farmers in 1914-15 give a total area of 167,012 acres, and a total yield of 914,926 bags, the largest crop ever yet produced in Southern Rhodesia, and a satisfactory amount, considering the somewhat abnormal season and the economic position of the country at present. With the native-grown crop of maize, separate returns of which are not available, the gross total grown in Rhodesia last year must have been well over a million bags. The total yield of maize grown by Europeans increased by 280,793 bags over the previous year, no less than 44.28 per cent. Owing to disturbed economic conditions, difficulty was experienced in finding markets for maize exported last season, continental ports being virtually closed, but market was found mainly in England, and in part also in Australia. Our net surplus, the difference of exports over imports, amounted to upwards of one third

of a million bags, as against 209,581 bags the previous year. The total local consumption and stock carried over to next season amounts to 574,154 bags of our own, together with 12,996 bags of imported grain and meal. The particulars are sufficiently important to be given in detail, and the two years for which these data are available may advantageously be compared:—

Maize Returns for Southern Rhodesia.

	1914.	1915.
	In bags of 203 lbs.	
Total production	634,133	914,926
Reserved for home use by farmers	137,656	156,248
Exported (grain and meal)	213,898	353,768
Imported (grain and meal)	4,317	12,996
Balance of exports over imports ...	209,581	340,772
Retained for local consumption for year and carry-over	286,896	417,906

(Native-grown crops are not included in above returns.)

The record of the export of maize from the first initiation of the oversea trade furnishes an interesting study. Fluctuations are attributable to variations in our seasons and harvests, to miscalculations by exporters through want of data, to unevenness in the carry-over from a past season due to the same cause, and to the variations of crops and prices of maize in neighbouring countries. Speculation, varying labour conditions on the mines and the war have also affected the position and interfered with the calculation of supply and demand. The growing conversion of maize on the farm into other products, such as meat and milk, also influences the amount available as a surplus for export. Uniformity can never be achieved, and considerable fluctuations from year to year are in the nature of things, but it is hoped that by means of a strong co-operative organisation, and with the aid of reliable forecasts based on information supplied by the growers, it may be possible to avoid serious commercial error, and to reduce to a minimum the importation which, owing to natural and economic causes, can never wholly be prevented.

The accompanying figures shew the fluctuations and the balance of trade during the past nine years:—

IMPORTS AND EXPORTS OF MAIZE INTO AND FROM SOUTHERN RHODESIA.

From 1907 to 1915 inclusive,

AND BALANCES OF TRADE IN POUNDS.

	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.
Exports ...	27,308	53,847	2,288,453	5,911,123	8,272,553	3,031,292	9,443,892	43,420,593	71,814,851
Imports ...	1,774,236	3,450,238	10,228,885	7,177,198	3,596,989	5,031,809	11,052,294	876,288	3,638,256
Balance of trade	−1,746,928	−3,396,391	−7,940,432	−1,266,075	+4,675,564	2,000,517	−1,608,402	+42,544,305	+68,176,595

The systematic grading of maize for export by the Government, commenced in the previous year, developed last season into a much larger undertaking, no fewer than five graders being employed. The benefits of this system are now generally realised. The Government certificate gives a sense of reliance to buyers in distant markets. The grading also induces farmers to be more careful in the preparation of their produce for export. The financial benefits are perhaps not directly obvious in a season when, owing to the high prices occasioned by the war, no great commercial difference is made between the grades exported from Rhodesia, all of which are of admittedly high quality. Against this may be set the gain through training farmers to prepare their grain properly for the export market, and its result in making our graded maize familiar on the corn exchanges at Home, which are two advantages of vital importance to the reputation of our staple export in the future.

As compared with the previous season, the production of tobacco in Southern Rhodesia last year shews a heavy fall from over three million pounds to under half a million pounds, and from 5,627 acres to 1,351½ acres. This reduction is attributable not only to the diminished acreage, but also to the reduction of the average acre yield from 544.11 lbs. in 1913-14 to 309.71 lbs. in 1914-15.

Potatoes are grown both as a summer crop and as a winter crop under irrigation, and the returns shew that approximately twice as much is grown in the summer season as in the winter, but that the heavier yields are obtained from the latter crop; the irrigated land usually being richer than that on which the summer crop is cultivated. The high returns now obtained for this crop all over the country are a noteworthy and encouraging feature.

For some time past the possibilities in regard to the export of oranges from this country have been recognised. With nearly 24,000 orange trees and about 10,000 other citrus trees already in bearing, and much larger numbers coming into profit within the next few years, there is good prospect of Rhodesia beginning export on a commercial scale next year, and securing an appreciable share in the supply of the world's markets.

European farmers are taking up the cultivation of ground nuts more actively, the oil factory recently established by the British South Africa Company proving an incentive, even on its present small experimental scale. Last year 10,471 bags were produced, apart from the native crop, the yield averaging 10.18 bags per acre in Mazoe, and 6.87 bags throughout the whole country. The factory anticipates being able to buy 7,000 bags next year. The possibility of exporting ground nuts is receiving consideration, and experimental shipments are being carried out at present. The mines largely use this article for native rations. Ground-nut cake, the residue after extraction of the oil, is now obtainable from the factory at Salisbury, and is readily bought up for feeding to fattening and dairy cattle. Another oil crop which is increasingly popular, although last year only 424 acres were grown, is the sunflower, utilised both by the oil factory and for feeding to poultry and stock generally. The average yield of the Territory was 580 lbs. per acre, and the total production 123 tons last year.

Wheat also is being more extensively cultivated, although the total production is still small. Much more might be grown with profit to farmers and advantage to consumers. The total area under summer and winter wheat together was only 1,684 acres, and the yields 6,239 bags. This represents about 15 per cent. of our requirements, or nearly two months' supply.

There are quite a number of other crops which are now coming into general use as the result of satisfactory trials over several years, but of which precise returns have not in all cases been collected. Among such may be mentioned teff grass, millets, Napier's fodder, dhal, cow-peas, velvet beans, linseed, buckwheat. Other crops, long known but hitherto not widely grown, are now being cultivated on a larger scale than hitherto, notably kaffir corn, oats, barley, beans, peas, onions, sweet potatoes and kaffir melons.

The experimental work with crops, conducted by the Department on the Government farms and in conjunction with farmers all over the country, continues to add to the variety of our economic products, and to spread abroad a knowledge of these and of their value, so that the country is rapidly becom-

ing more and more self-supporting, and there is good prospect of additional crops beside maize and tobacco being cultivated for export. Naturally the process of introducing new crops is slow. Once the possibility of growing a crop is proved—that is, its requirements of soil and season and treatment have been experimentally ascertained—markets have to be assured before production can be expected on a commercial scale. Consumers and merchants are often shy to abandon well-known sources of supply for new and untested ones; prejudices exist against the local article, and farmers are easily and not unreasonably discouraged by want of appreciation of their early efforts. It is in this connection that the oil factory is so great a boon to the farmer. Similarly, though less directly, the bacon factory and the creamery lead to new crops being grown for cow and pig feed. There is room for further development in this direction to overcome the difficulty of the consumer awaiting a reliable supply before patronising the local product, while the producer expects from the outset a steady demand before proceeding to the expense and risk involved in production on a large scale. By organising markets and giving publicity to the possibilities of new crops, these drawbacks are being overcome. The value, the necessity even, of growing crops other than maize in rotation for the restoration of soil fertility is being more and more recognised. A few years ago crops in rotation with maize, such as velvet beans and teff grass, were hardly known; to-day they are quite commonly met with. Wheat and oats as summer crops are being increasingly grown, ground nuts and sunflower are coming into favour as oil crops and others are being tried; forage crops, such as Napier's fodder and a number of exotic grasses for hay and silage, are being widely disseminated; dhal is becoming established and appreciated, whilst at the agricultural laboratories at Salisbury amongst the experimental plots may be seen a number of new introductions which promise to take important places amongst the standard crops of the Rhodesian farm of the not very remote future. Experiments in the use of artificial fertilisers, in cultural methods and in the introduction of a profitable system of rotation are also in progress, and our knowledge on these and kindred points is steadily expanding and becoming more precise. Reports regarding these experiments are made widely public, not only through the

medium of the *Rhodesia Agricultural Journal*, but by visits of members of the staff to farmers' associations, where addresses are given, and points of agricultural interest informally discussed.

General.—The view is commonly expressed that everything is at a standstill on account of the war, but such an assumption is not borne out by an examination of certain of our leading export lines during last year, as compared, say, with five years ago. In many instances the increase, according to Customs returns, is very considerable. These figures afford a good index of the growth of the agricultural and pastoral industries of the country, in spite of the war and a none too favourable season.

Exports from Southern Rhodesia.

	1910.	1915.
Hides—ox and cow	208,699 lbs.	706,770 lbs.
Skins—sheep and goat	136,638 ,,	201,580 ,,
Mealies	5,911,123 ,,	71,814,851 ,,
Tobacco (unmanufactured) ...	322,334 ,,	1,560,025 ,,
Wool	5,399 ,,	36,123 ,,

Owing to the necessity for rigorous economy, and the absence of many of the staff, the Agricultural and Veterinary Departments can record no expansion. It is unfortunate that the work should suffer a temporary check, but in the circumstances unavoidable. In this young country of many possibilities and unsolved problems connected with the development of its natural resources, activity in those branches of Government devoted to agricultural research, the application of science to farming, and the assistance of the pioneer and settler, is really a prime essential to all progress. To report no expansion is, therefore, very regrettable, but conditions brought on by the war must be the only explanation and sufficient excuse. The administrative business of the Departments has been carried on without interruption. It is the advisory and research work which has been restricted, and the technical side which has had to limit its activities and curtail expenditure. The strength of the Agricultural and Veterinary Departments must increase *pari passu* with the development of the country, and considerable increase will be necessary at

once on the return of normal conditions, especially if the officers of the Departments are to maintain that personal relationship with individuals and that close touch with the concerns of each district that are so very desirable.

The difficulties under which the Veterinary Department labour are well brought out by the detailed account given by the Chief Veterinary Surgeon in his report of the steps taken to combat the outbreaks of Coast Fever round Salisbury and Melsetter, and they are accentuated by the absence on active service of so many of the Veterinary Surgeons and Cattle Inspectors.

A novelty deserving of special notice is the experiments in stall feeding of cattle which have attracted much deserved attention, especially amongst arable farmers, who foresee the possibilities of profitably fattening cattle on crops they grow in place of feeding them only on the veld. The widespread adoption of this system would revolutionise to a large extent our farming practice with great benefit to all concerned—breeder, arable farmer and consumer alike.

An interesting result of the development of the dairy industry is the initiation of co-operative undertakings amongst groups of farmers for the marketing of their produce, and there is reason to hope that the successful small beginnings made may lead to considerable developments in the early future.

The Citrus Expert has now made himself conversant with the conditions and prospects of the industry committed to his charge, and has visited practically all the orange growers. The effects of his activities are becoming satisfactorily apparent, and he reports favourably on the prospects of producing and exporting oranges on a considerable scale within the next few years. There is, of course, much preliminary spade work to be done, but the outlook is encouraging.

The Agricultural Engineers are very fully employed, and constantly have applications for their services far beyond their powers to overtake. Advantage is being largely taken of the provisions of the Water Ordinance to secure the definition of their rights by persons to use the water of public streams;

whilst the lessons of recent droughts have not been thrown away, and water for stock is everywhere being secured, particularly by the development of underground supplies.

The Entomologist's report reflects steady progress in our knowledge of insect pests, although it is to be regretted that it was not possible to conduct investigations regarding tsetse fly and trypanosomiasis in the absence of the Entomologist on active service in Europe, when the whole duties of the branch were carried on by the Assistant Entomologist. Fortunately the country remains free of locusts.

The chemical branch of the Department has suffered through the absences of the Chemist, employed on active service, and of the Assistant Chemist. Research has almost entirely been suspended in the face of this shortage of staff, and on account of steadily increasing demands for information and advice on chemical matters connected with agriculture. The number of examinations of the dipping fluid used in tanks has grown in successive years from 23, 109, 132, and last year to 573. When it is remembered that the examination of six or seven samples is all that can be done in one day, it will give some idea of the labour involved under this head alone. The Veterinary Department also supplied a large number of subjects for examination for suspected poisoning, in many of which the presence of arsenic was detected, whereby not only the source of danger was discovered, but also fears that sudden mysterious deaths were due to contagious disease were allayed. There remain, however, numerous cases of death due to vegetable poisoning in the veld demanding investigation, which at present it is unfortunately impossible to give.

Reference must be made to the working of the law governing the sale of fertilisers and farm foods, which has been found to operate smoothly and effectually. The use of fertilisers is constantly growing, as the profit of the practice is increasingly demonstrated. The results of experiments, both by the Department and by individual farmers, justify the application of concentrated artificial manures on several crops, particularly maize, tobacco and potatoes. A slight offset against the high cost of this commodity lies in the fact that smaller

applications are found effective here than appear usual in the Union of South Africa, and very much less than is required in England and Europe, a fortunate state of affairs probably associated with a greater activity of fungoid and bacterial organisms in our soils, and the great vigour of all forms of vegetation which is manifested during our growing season.

A feature of the year in this connection has been the scarcity of potash owing to the war, as this commodity previously all came from Germany. Attention has been given to fresh means of supplying this element of plant food.

Farmers' Association Meetings.

In each issue of the *Journal* we print a table giving particulars of the meetings of all farmers' associations in Southern Rhodesia. This is as accurate as we can make it, and we revise it regularly, but we are dependent upon the information sent in by the honorary secretaries. We should take it as a special favour if the secretary of each association in the country would send us, before 20th July next, full details as to the place of meeting, name of secretary and dates of future meetings of his society. We desire not only to correct any errors there may be in the table as now published, but also to receive confirmation of its general accuracy, so that we may be confident that we are not issuing misleading information. We may at the same time remind secretaries of the importance of advising us immediately of any changes that may from time to time be made in respect to the details shewn in the table referred to. —Ed., *Rhodesia Agricultural Journal.*

Report of the Chief Veterinary Surgeon

FOR THE YEAR 1915.

African Coast Fever again occupies the largest place on the record. The total number of fresh outbreaks and the mortality compare very unfavourably with previous years, due to the extensive spread of infection in the Salisbury and Melsetter districts and the re-infection of Mazoe district after over ten years of freedom. On the other hand, there is a great deal of satisfaction in being able to record that the whole of Matabeleland and the greater portion of Mashonaland, many districts of which were formerly infected, remain free from this plague. With the assistance and support of cattle owners in the districts now affected in carrying out the measures necessary for eradicating infection, it is not too much to hope that at no very distant date we shall be able to apply the same remark to the whole Territory. The difficulties in dealing with the disease now are somewhat greater than they were some years ago, because of the great increase in the numbers of cattle, but these are very largely counterbalanced by the use of the dipping tank as a preventive measure.

With regard to other diseases generally:—Redwater and gall-sickness, being enzootic, are the cause of some loss annually, especially amongst improved and imported pure-bred cattle. Trypanosomiasis is a constant menace in certain districts, especially in opening up new ground. Contagious abortion has been located at a few centres. Horse-sickness is a seasonal visitor. Otherwise we are remarkably free from specific diseases of a destructive nature which affect the domestic animals, and more especially contagious pleuro-pneumonia (lung-sickness) of cattle, which exists in some of the adjoining territories, and which is a constant menace to us.

African Coast Fever.—*Salisbury District.*—At the beginning of the year there were five centres of infection. On three of these no cases of disease occurred; on the other two,

a heavy mortality was registered during January and February, since when, with the exception of one case in March, the herds have been healthy. In January the disease broke out on the farms Mabel Reign and Sigaro. In each instance one beast only was infected, and no further cases occurred. In April a serious outbreak occurred on the farm Helenvale, about 10 miles east of Salisbury. The degree of infection was so intense that it was deemed advisable to dispose of the herd. The diseased animals were destroyed and the remainder slaughtered for food purposes, with the exception of two valuable dairy cows, which the owner was permitted to retain on condition that they were stabled until the farm should be released from quarantine. The erection of a fence around the farm was immediately put in hand, but within three weeks the suspected existence of infection was reported from the adjoining Borrowdale Estate, and investigation shewed a gross and virulent infection on various sections thereof. The degree of infection may be gathered from the fact that within 30 days 55 animals positively affected with Coast Fever were destroyed. To anyone acquainted with the nature of Coast Fever and the life history of the vectors, it is clear that infection had existed on Helenvale and Borrowdale for several months prior to its definite diagnosis. In this connection reference has been made to an investigation by one of the Veterinary staff into some cases of sickness reported from Helenvale prior to the discovery of Coast Fever infection there. The officer concerned proceeded on war leave prior to the latter event. His official report shews that on the 3rd February he visited Helenvale and made a *post-mortem* examination on a cow, the lesions pointing to poison; another cow was affected with "stiff-sickness," and an ox shewed a high temperature. Blood and gland smears from these cases proved negative on microscopic examination. He also records that on the same day he examined the cattle on an adjoining farm, and found that stiff-sickness existed among them. It is not at all unlikely—in fact, there can be little doubt that Coast Fever infection did exist on Helenvale on the date of this inspection, but it was masked by stiff-sickness or "three-day-sickness," which existed there and throughout the district. In April the disease also broke out on the farm Glen Lorne, adjoining Helenvale, and in the following month on the farm Sternblick.

which is some distance away. The latter outbreak was doubtless due to an illegal movement of cattle from Borrowdale in February, which movement was the subject of police court proceedings, resulting in the conviction of the party concerned. Subsequently the farms Luna, Carrickcreagh and Greystone, all adjoining Helenvale and Borrowdale, became infected. In order to limit if possible the spread of the disease, all the infected farms were fenced. The result has been satisfactory, inasmuch as infection has not extended to any but the herds in direct contact with the first discovered centres of infection. The original source of infection in these cases has been much discussed, but no satisfactory explanation is as yet forthcoming. I have little doubt that it was the Epworth infected centre, some ten miles distant. This area is fenced, and when and how the actual transmission took place I am unable to suggest. The methods adopted for dealing with the disease at these centres, in addition to the fencing already referred to, were three-day dipping and temperaturing all the animals, blood and gland smears being taken in suspicious cases, and in the event of a positive result being returned, the animal was immediately destroyed, the object of this procedure being to restrict the dissemination of infected ticks. Except in the case of Borrowdale, the farms were too small to attempt the temperature camp system of removing the herds to clean veld. At Borrowdale this method had to be abandoned, as the supposed clean veld to which the cattle were removed proved to be infected.

Mazoe District.—On the 12th May the cattle owners of this district, which had been free from Coast Fever for at least ten years, were astounded by the announcement that the disease had broken out on the Belfort Estate, which estate is in the same ownership as Borrowdale, Salisbury district. The herd affected had been brought from the Mtoko district *via* Borrowdale, touching there on 12th April. As this case was subsequently the subject of proceedings in the High Court, resulting in the conviction of the party concerned, and the imposition of a fine of £100, for the illegal movement of the cattle referred to from Borrowdale to the Chindamora native reserve, it is unnecessary to refer to it further here. In August an outbreak occurred in a small herd at the Mazoe dipping tank, as the result of infection left by the Mtoko herd,

which had been sent from the Belfort Estate to the tank on 4th May—that is, eight days prior to the discovery of Coast Fever in it. In October another herd on this route, and also close to the tank, became infected. The Belfort herd was gradually slaughtered off. The two latter herds have been regularly dipped and temperatured, and up to the end of the year no further cases had occurred amongst them.

Umtali District.—No fresh cases of Coast Fever occurred on the one centre regarded as infected at the beginning of the year. It is now 19 months since the last case. During the months of July and August several head of cattle died in the Penhalonga Valley, and *post-mortem* examination in one case shewed lesions strongly suspicious of Coast Fever infection, but microscopic examination of blood and gland preparations proved negative. It was, however, considered advisable, in view of the *post-mortem* lesions, to regard this as an outbreak of Coast Fever; therefore dipping every five days was begun immediately, and the herd kept under close observation. Two further deaths occurred during October, but *post-mortem* examination shewed in each case that death was due to other causes. A fresh outbreak occurred on the farm Penkridge, on the southern border of the district, but as it is so closely associated with the outbreaks in Melsetter district, it will be included with them.

Melsetter District.—At the beginning of the year there was one infected farm, viz., Nooitgedacht. In January the disease broke out at the adjoining farm Clearwater, also on the farm Springfield, which lies some distance away, and in an isolated position in relation to the existing infection on Nooitgedacht. In February another farm adjoining Nooitgedacht became infected. No fresh outbreaks were registered in March, but, beginning in April, a rapid and extensive spread of infection took place, and at the end of the year the total number of farms on which the disease had broken out amounted to 24. The degree of infection and the rapidity of its spread was most acute from April to July inclusive, when 13 outbreaks occurred, mostly in a southerly direction, the farthermost from Nooitgedacht being 25 miles. In August an entirely unexpected outbreak occurred on the farm Quagga's Hoek, on the northern boundary of the district,

and over 30 miles as the crow flies from the nearest point of infection, viz., Springfield. The degree of infection in this case, and also that it had existed for a considerable period, are apparent from the fact that within four weeks of its being reported 43 head out of a total of 82 succumbed. Under such circumstances it was not surprising that the disease shortly appeared on three farms in the vicinity.

The rapidity with which the disease spread, and the heavy mortality which ensued in a number of herds, naturally caused a great deal of consternation in the district. The majority of farmers had suffered very heavily from the first visitation of Coast Fever, and being so far from a market for agricultural products, regard cattle as the mainstay of their farming operations. Consequently the causes of the spread of infection have been much discussed, and it is generally believed that the measures adopted for dealing with the original outbreak at Nooitgedacht were inadequate. I do not agree with this view. I am firmly convinced that a good deal of infection was spread from Nooitgedacht before the existence of the disease there was discovered, and which, not being suspected or reported, gradually accumulated in intensity, and its transmission from farm to farm was simple and easy because of the gross infestation of ticks. It is doubtful if any other district was so grossly infested with these as Melsetter district during the autumn and winter months. Of course, ticks cannot spread infection without the assistance of cattle. In this respect the explanation is, I think, that many farmers never herded their animals, which were allowed to roam where they pleased. It can be readily understood, therefore, that one diseased animal could easily infect a large area, including portions of several farms, without the owners of same knowing anything about it. It has to be borne in mind, too, that in the Melsetter district, with the large farms and relatively small herds of cattle, such infection may lie for several months before susceptible cattle come in contact with it. Another possible factor in the transmission of infection in certain cases was the custom which existed of helping the donkey transport rider out of difficult places with oxen, and there is no doubt that in some cases oxen on adjoining farms came in contact or traversed the same ground in donkey or other wagons.

When the seriousness of the situation was realised, the cattle owners of the district unanimously petitioned that the provisions of the Compulsory Dipping Ordinance of 1914 should be put into force, but as a considerable period is required by the Ordinance before effect can be given to such request, compulsory dipping was instituted under the Animals Diseases Consolidation Ordinance of 1904. There were less than half-a-dozen dipping tanks in the district, and the cost and supply of materials seemed almost insuperable; but, assisted with advances of cement by Government, over 60 tanks were erected in a few months.

The policy which was adopted at the original outbreak at Nooitgedacht, viz., temperaturing and isolation of sick and suspected animals, together with three-day dipping, has been carried out, also when suitable clean veld was available the herds were removed thereto through a temperature camp. In some cases when the herds were freed from infection and placed on clean veld, re-infection occurred through carelessness in herding, and in more than one instance by bringing the cattle back to the infected veld.

In dealing with fresh outbreaks, we were compelled in most cases, owing to the local conditions, to rely on dipping for eradicating infection. The results have varied, but they bear out our former experiences, viz.: (1) where dipping in solutions of proper strength had been regularly practised prior to the outbreak, the losses were infinitesimal this is exemplified in the Mabel Reign and Sigaro cases; (2) where dipping had not been practised, and where tanks were not immediately available, the losses, as in a great many of the Melsetter outbreaks, were heavy; (3) where veld is grossly infected to begin with, cases of disease occur up to twelve months from the institution of regular dipping.

In dipping for the eradication of Coast Fever infection, the greatest care is necessary in maintaining the solution at the proper strength. The tendency in most cases is to allow it to become too weak: in districts such as Melsetter, where the rainfall is generally very heavy compared with most other districts in the Territory, and where it frequently rains for days in succession, another factor which has considerable in-

fluence on the success of dipping is introduced, viz., the washing of the dip off the cattle by rain immediately they come out of the tank, thereby reducing, or even completely nullifying, its effects. This might be obviated by the erection of sheds in which the cattle could be detained until dry, but unfortunately the expenditure involved is beyond the reach of most cattle owners.

Dipping Tanks and Dipping.—At the end of the year there were 595 tanks in use in the Territory, an increase of 168 during the year. The Compulsory Dipping Ordinance of 1914, the provisions of which are brought into effect on the petition of a majority of landowners in any area, is now in force in two large sections of the Salisbury district, an area including the greater part of the Melsetter district and a portion of the Umtali district and the northern portion of the Marandellas district, whilst petitions have been received for its application to the Makwiro section of the Hartley district and the Shamva section of the Mazoe district.

Contagious Abortion in Cattle.—The existence of this disease in Southern Rhodesia was first discovered in October, 1914. During the year under review several additional centres of infection were discovered in the Marandellas, Salisbury and Mazoe districts. In every instance the number of abortions observed is very small, and that the actual number is not great is evident from the fair percentage of calves born at the proper period: thus bearing out the view expressed in my last year's report, that the disease appears to be in a less virulent form here than in England. It may be, however, that the disease is no less virulent, but that the climatic conditions which obtain here are more destructive to the infective materials, and that the conditions under which cattle are kept are less favourable for the contraction of whatever infection exists.

Mortality in Calves.—Generally speaking, 1915 was a bad calf year, chiefly because of the very heavy rains. In various native districts a heavy mortality occurred. This is not surprising, considering the abominable manner in which the herds are kraaled; indeed, it is not at all uncommon for calves to be drowned in the mud and slush of the kraals during the rains. Amongst better bred stock, the calf mortality was

also heavy, attributed by the owners to white scour, lung disease, liver disease, hair-balls, etc., but the primary cause in most cases is the tick (with the assistance occasionally of that modern invention known as the cream separator). It has been clearly demonstrated in scores of cases throughout the Territory that regular dipping reduces the mortality from white scour and other calf disorders to a minimum. Anaplasmosis (gall-sickness) and piroplasmosis (redwater) are also to be included amongst the causes of this unusually heavy mortality.

Three-Day Sickness.—This mysterious disease reappeared in a number of districts during the months of January and February. Although generally regarded as a non-fatal affection, a slight mortality was reported, due probably to the heavy and continuous rains experienced whilst it was prevalent, or may be to the administration of medicine.

Parasitic Gastritis of Cattle.—The twisted stomach worm, or wire-worm (*Hæmonchus contortus*), is frequently observed in cattle throughout the Territory, and is a greater cause of loss than is generally realised. It is, fortunately, a very infrequent occurrence for infestation to assume such serious proportions as it did in a large herd in the Umtali district, where over 250 head succumbed during the months of January and February.

Trypanosomiasis.—The position in regard to this disease as affecting domestic animals is practically the same in the Hartley and Lomagundi districts as during the previous year. In the Melsetter district several cases were diagnosed in cattle on two farms adjoining Portuguese territory. As far as is known, there is no tsetse fly in the Melsetter district, but it is plentiful in the low veld a short distance across the border. The infection in these cases may have been contracted by the cattle straying, or, what is more likely, by a temporary extension of fly up the low-lying valleys into our Territory during the rainy season.

Rinderpest.—Since the outbreak of the war no information has been received as to the rinderpest situation in German East Africa. In September, District Veterinary Surgeon Hooper Sharpe was despatched to the Northern Rhodesia-

German border to assist in the measures adopted for preventing its spread southwards.

Tuberculosis.—No cases of tuberculosis occurred during the year. The tuberculin test was applied to 78 bulls and heifers imported from the United Kingdom, and a certain number of pure-bred stock from the Union of South Africa, with negative results.

Anthrax, Lung-Sickness (Contagious Pleuro-Pneumonia of Cattle), Black Quarter or Quarter Evil, Rabies. —No cases of any of these diseases occurred during the year.

Glanders.—The continued freedom of the Territory from this disease is gratifying. The mallein test was applied to all horses, mules and donkeys on importation, without a single positive re-action. To this protective measure, which has been practised for over 15 years now, must be ascribed the remarkable immunity from this disease which we have experienced.

Horse-Sickness.—The mortality in horses was the heaviest for many years; in some districts scarcely one was left. On the other hand, that amongst mules was comparatively slight, due to the results of immunisation by the Theiler method. Accurate statistics are not available, but in Matabeleland the deaths of 343 horses and 98 mules were reported.

Diseases of Small Stock.—In the eastern districts very heavy losses amongst sheep were sustained through an exceptionally severe visitation of blue-tongue; in a number of instances the mortality exceeded 60 per cent. Throughout the Territory a considerable mortality occurred amongst sheep and goats as a result of the heavy rainfall and infestation with various internal parasites, the commonest being tape-worm, wire-worm and cestode cysts.

Importation of Cattle from Northern Rhodesia.—The introduction of all horned stock from Northern Rhodesia was prohibited as from 31st December, 1914, but on account of the difficulty of bringing in all animals purchased for importation, the time limit was extended for two months. This prohibition was imposed, in the first instance, because of the uncertainty regarding the rinderpest position in German East Africa, and

the possibility of its being carried southwards by military transport operations. It was necessary to maintain this prohibition, in consequence of a serious and unexpected outbreak of contagious pleuro-pneumonia (lung-sickness of cattle) in Northern Rhodesia; and as a further precautionary measure against the introduction of this disease into our Territory, all the cattle on the south bank of the Zambesi in the Falls section were moved some miles backwards, and a police cordon established to prevent cattle crossing from the northern side.

Importations of Stock.—

From the United Kingdom:—Bulls, 41; heifers, 37.

From the Union of South Africa:—Bulls, 374; heifers, 2,174.

From Northern Rhodesia:—Horned cattle, 3,761.

Other importations from the Union of South Africa:—Horses, 582; mules, 208; donkeys, 670; sheep and goats, 36,365; pigs, 130.

Show Dates.

Gwelo ...	...	7th and 8th June.
Hartley	...	12th and 13th June.
Victoria	...	16th June.
Rusape	...	6th July.
Umtali	...	13th and 14th July.
Salisbury	...	27th and 28th July.

Does it Pay to Spray Potatoes in Southern Rhodesia?

PROGRESS REPORT.

By Rupert W. Jack, F.E.S., Government Entomologist.

The disease of potato plants known as Early Blight has been estimated to reduce the potato crop by as much as 50 per cent. in some seasons in certain States of North America. In Southern Rhodesia it is probable that in many seasons the total percentage of loss is not far short of the above. Year after year a large proportion of the summer potato crop in this country is prematurely bereft of its foliage by this disease, but, as the tubers themselves are not actually attacked, and, as the crop may yield a profitable return in spite of the disease, this pernicious blight is commonly overlooked by the farmer or the losses due to its influence greatly under-estimated.

General Notes on Early Blight.—The disease caused by the fungus, *Alternaria solani*, is characterised by the appearance of brown brittle spots in the tissue of the leaves. These spots increase in number and spread until the whole leaf is involved, and in the latter stages of the disease the dead shrivelled leaves hang down from the still green stems for some time before the latter also succumb. The spots usually appear shortly after the plant has flowered, but late-planted crops may be attacked even earlier. The disease is confined to the foliage, the tubers shewing no ill effects at all, except that owing to the premature death of the foliage their development is arrested and the yield is thus lessened, frequently to a very considerable extent. The disease is spread by means of spores produced on the brown patches and carried by the wind. These spores germinate on the surface of the

leaves, the fungus filaments making their way into the tissues through the *stomata* or breathing pores. The action of Bordeaux mixture lies in destroying the germinating spores and thus preventing the fungus from entering the leaf. As the fungus is mainly confined to the interior of the tissues of the plant, within which it is able to spread freely, it follows that control measures must aim rather at prevention than cure. Hence the plants must be kept covered with the mixture from before the appearance of the disease on the leaves. To commence spraying after the disease has commenced to injure the plants noticeably has little or no effect, as a rule, in checking the progress of the trouble.

Loss from Early Blight is dependent upon climatic conditions, and is associated with warm, dry climates. The name Early Blight is very misleading, as the very early crops in this Territory, which are planted about August and irrigated, suffer very little, and, in our experience, the disease takes a heavier toll the later the crop is planted. There appears to be no need to spray the early crop grown under irrigation, but all crops planted under the natural rainfall are liable to suffer heavily.

Experimental Work.—In the seasons 1911-12 and 1912-13 experiments were conducted with the spraying of two varieties of potatoes with Bordeaux mixture with a view to ascertaining the possibility of controlling this disease to a profitable extent. The varieties used in these trials were "Early Rose" and "Northern Star," both of which are particularly subject to the disease, and the results of the experiments were published in the *Rhodesia Agricultural Journal* for August, 1913, in an article entitled "Potato Spraying Experiments for the Control of Early Blight." Having obtained favourable results from the spraying of these susceptible varieties, it was decided to continue the experiments with the "Up-to-Date" variety, which is that most widely grown in this Territory, and is also one of those most resistant to the blight. These experiments have been carried out for the last three seasons, with the results made public in the present article.

There is one point to which it is necessary to call attention in connection with these tests, and that is that a really heavy

yield of tubers has not yet been obtained in the experimental plots. This has been a disappointment, as in each case the ground was freely manured. Owing to this fact information is still lacking as to the increase in crop to be expected from spraying potatoes that would in any case give a fairly heavy return. If the percentage of increase obtained in the case of average or small yields were to hold with heavy yielding crops, the extra profit from spraying would be very handsome indeed. This by no means follows, however, as the more vigorous plants may be more resistant to the disease, and the difference between sprayed and unsprayed plants correspondingly lessened. Further experiment alone can determine this point. It may be noted, on the other hand, that in a pamphlet dealing with potato spraying in the State of Wisconsin, U.S.A., where Early Blight is reported to be the only prevalent leaf disease of this crop, Messrs. Sandsten and Milward emphasise the statement that "the more favourable the tillage conditions, the larger the returns which may be expected from spraying" (University of Wisconsin, Bulletin No. 168, November, 1908).

In carrying out the experiments during the past three years the procedure adopted has been the same as that followed during the first experiments, namely, the spraying of alternate rows and the checking of the yield of each row against that immediately adjacent to it. The object of this is to avoid, as much as possible, error arising from difference in fertility in different parts of the plot, and from irregularities in the incidence of the disease. Whilst this plan is considered the freest from sources of error, there are two points to be noticed in connection with it. The first of these is that the sprayed rows are subjected to greater chances of infection from the adjacent unsprayed rows than would be the case if the whole plot were sprayed, and the second is that the intervention of sprayed rows between those not sprayed may possibly act to a slight extent as a shield to the latter in intercepting the passage of spores from one plant to another, and thus tend to check the rapid spread of the disease. If these facts have any appreciable effect at all, it must obviously be in the direction of decreasing the difference in yield between the sprayed and unsprayed rows.

Plate I.

The fluid used in all the spraying experiments dealt with in the present article has been Bordeaux mixture, consisting of 4 lbs. of copper sulphate, 4 lbs. of fresh lime to 40 gallons of water. It may be referred to conveniently as the 4-4-40 formula. This is the formula most generally adopted for spraying potatoes against the Late Blight (*Phytophthora infestans*) in other countries, and the first series of experiments conducted at Salisbury indicated that an almost similar formula (namely, 4½-4½-50) was as effective in controlling Early Blight as a stronger preparation (6-6-50), and more effective than a weaker one (3-3-50).

With the exception of the season 1913-14, the increase of crop due to spraying has been considerable, especially when judged by percentage of increase over the unsprayed rows. The failure of the 1913-14 spraying was due to the practical failure of the crop owing to lack of rain in March, both sprayed and unsprayed rows dying down together from lack of moisture. In other seasons the life of the sprayed plants has exceeded that of the unsprayed from a fortnight to three weeks, and this has naturally resulted in the production of larger tubers and a heavier crop. In the 1914-15 experiments, in spite of the application of six tons of well-rotted kraal manure per acre, the whole crop was a very light one, considerably over half the weight of tubers being unsaleable owing to their small size. The actual return per acre was under three tons. This crop was grown from newly imported seed. There would be no object in giving an analysis of the results of that season's tests, but it may be stated briefly that the weight of marketable tubers in the rows sprayed weekly exceeded the controls by from 16 per cent. to 57 per cent. according to the number of applications, those in the rows sprayed fortnightly shewed an advantage of from 54 per cent. to 80 per cent. according to the number of applications, and those sprayed three-weekly an advantage of from 12 per cent. to 63 per cent., the latter results being, however, inconsistent with the number of applications.

The crop used for experiment during the past season was planted at the Agricultural Experiment Station, Salisbury, on 31st December. The ground received well-rotted kraal manure at the rate of six tons per acre, the manure being dis-

tributed in the trenches dug for the reception of the seed. The seed was locally-grown "Up-to-Date," from seed imported the previous year. The rows were 2 feet 6 inches apart, and the plants 15 inches apart in the rows. The first spraying was given on 27th January when the plants were 8 to 12 inches high. Two rows received seven weekly sprayings, two rows four fortnightly sprayings and two rows were sprayed three times at an interval of three weeks. There is little doubt that a heavier crop would have been obtained but for the abnormally dry weather experienced during February. As it was, the yield was light, the best of the sprayed rows yielding at the rate of five and a quarter tons per acre, some of the unsprayed rows being as low as just over three tons, the average of the unsprayed rows being, however, nearly four.

The returns are analysed in the following tables:—

PERCENTAGE OF INCREASE FROM SPRAYING.

Interval, days.	No. of Applications.	Total Yield.			Table Tubers.			Seed Tubers.			Marketable Tubers.
		Sprayed, lbs.	Unsprayed, lbs.	Increase, per cent.	Sprayed, lbs.	Unsprayed, lbs.	Increase, per cent.	Sprayed, lbs.	Unsprayed, lbs.	Increase, per cent.	Increase, per cent.
7	7	104	77	35	38	16	137	41	26	57	88
14	4	87	59	30	15	10	50	41	28	46	47
21	3	87	77	16	19	15	26	48	42	14	17

ESTIMATED PROFIT FROM SPRAYING.

Interval, days.	No. of Applications.	Marketable Tubers, Increase per Acre. lbs.	Value, at ¾d. per lb. £ s. d.	Cost of Spraying, at 10/- per Acre. £ s. d.	Net Profit per Acre from Spraying. £ s. d.
7	7	3,772	11 15 0	3 10 0	8 5 0
14	4	1,836	5 15 0	2 0 0	3 15 0
21	3	1,020	3 4 0	1 10 0	1 14 0

It is to be noted that the figures giving the estimated profit per acre from spraying are calculated from a small area only, actually about one-hundredth of an acre for each two rows, and that, therefore, they only indicate what the profit per acre would be at the same rate of yield, and are not a statement of an actual profit obtained on an acre.

It is of interest to find that, as in the case of the trials with "Early Rose," the results of which were published in 1913, the greatest net profit was obtained from spraying weekly. In the State of Wisconsin it is recommended to spray three times over a period of forty-one days at intervals that would therefore be about twenty days. The summer rainfall in this Territory is presumably accountable for the fact that the more frequent sprayings pay best, the heavy showers tending to wash the mixture from the foliage.

Deductions.—From the experiments carried out up to the present we are justified in deducing that:—

1. Early Blight (*Alternaria solani*) can be profitably checked in the potato crop by spraying at intervals with Bordeaux mixture, commencing before the disease appears.
2. Such spraying pays as a regular practice with the summer crop on soils of average fertility where the disease is prevalent.

Explanation of Plates.—*Plate I.*—Potato plant dying from Early Blight (*Alternaria solani*).

Plate II.—Experimental plot of the "Up-to-Date" potatoes planted 31st December and photographed 3rd April. Alternate rows sprayed. The row immediately in front of the camera is an unsprayed one. The rows on either side received four sprayings with Bordeaux mixture (4-4-40) at intervals of fourteen days. On the left of the photograph may be seen four rows, two of which were not sprayed and two received seven sprayings at weekly intervals. The further unsprayed row is indistinct.

Eucalypts suitable to Southern Rhodesia, and how to Grow them.

By F. B. Willoughby,
Superintendent, Government Forest Nursery, Salisbury.

Eucalypts (gums) are always grown from seed. When making the seed beds, a warm, sunny situation should be selected near to the water supply, and for preference, with a rich, sandy, loam soil. The ground must not be shaded by trees, but low hedges of some such plant as dhal to keep off the wind are an advantage. The seed bed should be dug over deeply two or three times, and care should be taken that the surface is formed of specially good soil. The beds should be carefully levelled and the seed sown broadcast, after which it should be gently pressed in to the soil with a brick or piece of plank. No earth covering is required, except for the very large seeded varieties, such as *Eucalyptus calophylla*, *E. citriodora* and *E. maculata*. These should be covered as lightly as possible with loose soil or leaf mould.

After sowing, the beds must be covered to prevent the surface from baking and drying out too quickly. The best material for this purpose is loose grass laid on the surface fairly thickly, but not so thick that water cannot easily penetrate. In some parts of Rhodesia white ants are too troublesome to allow the use of grass, and in this case some substitute, such as "limbo," should be used. Grass should be used if possible, as nothing else is so satisfactory, but it must be taken off as soon as the white ants appear. Gum seeds will germinate within 8 to 14 days.

As soon as the young plants make their appearance the covering must be gradually removed to prevent the seedlings becoming drawn. At this stage it is best to remove all the old grass and clean and weed the beds thoroughly; then put on a thinner covering of new grass, which in a few days is also removed and replaced by "limbo" or thin grass screens. This

"limbo" or grass thatch should be stretched on a light frame so that it can easily be removed according to the weather, as it is often only required for a few hours during the heat of the day. As soon as the seedlings are strong enough, all covering should be removed to allow them to harden off.

It is usually sufficient to give the seed beds one good watering a day. If the weather is very hot, however, it may be desirable to water twice a day, especially if no sides have been provided to prevent the wind blowing under the thatch and drying out the surface. Watering cans with a very fine rose should always be used, and it should be remembered that heavy watering washes away the fine top surface and often the seeds as well. If moss is seen on the beds, it is a sure sign that too much water or shade is being given, and treatment must be varied accordingly.

Gums are usually pricked out when about 1 inch high. It is best to prick out into tins or boxes, but as it is quite impossible for the average farmer to get sufficient tins or to give them the constant daily attention and watering required, tins are not dealt with in this article. The obvious alternative is to transplant into nursery beds. These beds should be well dug over, but a soil should be selected that is not too loose, as it is required to adhere to the roots as much as possible when the seedling trees are again lifted for planting out on the land. To prick out into nursery beds, take a small stick about 6 inches long and sharpened at one end. This is used for making the holes for the trees and pressing the soil firmly round the roots. Be careful that the roots go straight down, and when lifting from the seed bed cut the roots to about 3 inches in length, as they will otherwise only curl round in the hole. Place the trees in rows about 2 inches apart, with about 6 inches between the rows. After pricking out, the nursery beds should be shaded and kept well watered for about two weeks, until the trees have started to grow again. When once established very little attention is necessary. They require no shade, and only just enough water to keep them alive. The object is to grow a strong, hardy tree, with good fibrous roots, and not too many leaves, so that it will transplant easily.

The chief disadvantage of planting in beds is that there is nothing to prevent the tap root from going straight down,

Eucalyptus Seeds.—1. E. calophylla, 2. E. citriodora, 3. E. botryoides, 4. E. pilularis, 5. E. saligna, 6. E. rostrata, 7. E. polyanthema, 8. E. globulus, 9. E. crebra, 10. E. robusta, 11. E. amygdalina

Eucalyptus crebra.

Eucalyptus rostrata.

and a tree dependent entirely on a long tap root will not transplant readily. To check the growth of the tap root, plants grown in beds are usually "teased." That is, a long, sharp knife is drawn along the rows of trees at an angle so as to cut the tap root about 4 to 6 inches below the surface. It is safer to cut on one side only at one operation. The other side can then be cut a week or a fortnight later. This should be done about every month during the rainy season, and every two or three months during the winter. This treatment forces the tree to make small fibrous surface roots, which will be most valuable when planting out. In planting out, a good ball of earth should be lifted with each tree. This is easiest done with an ordinary garden trowel, and if the ground is at all sticky the natives will be able to plaster the soil around the roots so that the trees will travel a short distance quite well. When rather large gums are being planted, they should be cut back to about 3 inches in height, otherwise the tops are certain to droop and the tree may die. It does little harm to a gum to cut it back, as it will nearly always shoot up again. Much depends on the weather conditions at the time selected for planting. The work should not be begun until the rains have well set in, and it is best to plant on a rainy day, as no watering is then necessary. Large trees are not, as a general rule, desirable for planting, as the percentage of losses will be very much greater; 3 to 4 inches in height is about the ideal size.

Gum seeds should not be sown until October or November, unless it is intended to plant them in tins, when they may be sown a month earlier. When raising young trees there is usually a tendency to give too much shade. To obtain strong, healthy trees, the seedlings, as soon as they are established, should be exposed as much as possible to the full glare of the sun, and also to the wind, so that when transplanted into the open, they will be less delicate, and will, therefore, have a better opportunity to establish themselves again. January, February and March are usually the best months for planting out. The rains have then set in properly, and the sub-soil is well moistened so that the plants have a better chance to withstand any short droughts immediately after planting. If a tree is planted late in the season it will always manage to send its roots down to the sub-soil moisture, and only requires one good

rain to settle the surface. It will then make very little growth of leaves, so that the root will not be subject to undue strain. These late-planted trees usually stand extremes of drought and frost better than early-planted trees that have made a big growth of leaves. Also if planted early the weeds are very troublesome, whereas late-planted trees will grow almost as fast as the weeds in the following spring. The most satisfactory way to plant is to make a wire chain, each link of which is made the length the trees are desired to be planted apart. Six feet is a very good distance. To make the chain, get No. 12 galvanised wire. Then knock two nails into a convenient tree or verandah post 6 feet apart. Pass the end of the wire over the top nail, making a loop with at least 3 inches to spare for twisting. Then pass the wire under the bottom nail and cut it off, again leaving 3 inches of the wire bent round. These 6 feet lengths of wire are then joined together by twisting in the ordinary way with the fingers. It is not desirable to twist the wire in any elaborate manner, as it is often found necessary in planting to disconnect to suit the length of the land. A good sized loop is also desirable, or it will be found that the line will not fold up when not in use. About 200 yards is a very convenient length if a lot of planting is to be done, but for most purposes 100 yards is sufficient, and the shorter line is, of course, much easier to pull straight. It will only take two boys about an hour to make 100 yards of chain, and it will save a lot of time in the planting.

To mark out the land, stretch a length of wire along one edge of the land to make a straight guide line to work from. Then take the planting chain and knock in the peg of it alongside the guide line at the end where it is desired to start planting. The planting chain is then pulled from the other end so as to be at right angles to the guide line. Boys then go along with hoes making small holes at each joint of the planting chain, and always on the same side of the chain. No object is gained by trying to dig underneath the chain. The planting chain is pulled straight by one man after the peg has been fixed on the guide line. This is done by giving the chain a jerk upwards and then pulling steadily until the jerk has travelled right at the other end. The man at each end of the line has a 6 feet stick with which to measure off the distance for the next line. Under our local conditions of weather and labour,

it is preferable to get all the holes dug while the weather is fine, so that the trees can be quickly planted as soon as the rain comes. To prepare the land for planting, it is necessary to break it up thoroughly during the autumn or early spring, and cross-plough just before planting to destroy all weeds, etc. If the land is roughly prepared, or only ploughed once, it causes a lot of trouble and expense to keep down the weeds and grass during the first year. Plantations should require no cultivation after they are big enough to dominate the weeds, but until then it is a great advantage occasionally to put a cultivator through between the young trees. Great care must annually be taken to keep off veld fires.

The best distance apart to plant for plantations seems to be 6 feet by 6 feet under most conditions. It has been proved to be quite unnecessary and rather a disadvantage to plant any closer, except where it is desired to cut out a large number of saplings when about three years old. On good soil, where the trees can be expected to grow very rapidly and not many blanks will occur from white ants, drought, etc., they are sometimes planted 10 feet by 10 feet. Whichever distance is decided upon, there will always be a lot of poles that should be cut out after about the fourth year, when it can be seen which trees are going to thrive best. If they are drawn up too much they grow lanky and eventually bend over and become useless. They must always be allowed enough space to keep a good strong head of foliage, so that their growth will not be interfered with. They naturally make long, straight poles, free from branches, and they are so vigorous that they can never make the very dense plantations such as are formed with pines, etc.

Eucalypts are being extensively planted all over South Africa for producing quick-growing plantations of timber for mining props, rough farm work, firewood and eventually commercial timber. At one time it was thought that good commercial timber could be grown in about 20 years. Undoubtedly gums will attain to a great size in that time under favourable conditions, but the wood cannot be considered to be mature, and the results obtained from cutting up such wood have been rather unsatisfactory.

In Australia, their natural habitat, Eucalypts live to a great age, and reach huge dimensions, several exceptional

trees having been measured over four hundred feet high. The wood is there used for almost all purposes, including railway sleepers, harbour works, building material, wagon and boat making, paving blocks, etc., its uses varying according to the variety of the tree from which it is cut and the locality in which it is grown. It is impossible to say how long it will take in South Africa to produce commercial gum timber until results have actually been obtained. Probably quite good wood will be obtained in from 40 to 50 years. Of course wood cut from young trees is quite good enough for many requirements.

Eucalyptus rostrata.—The narrow-leaved variety of this species is undoubtedly the most widely distributed gum growing in Southern Rhodesia. It is particularly suitable for shallow red soils where other quick-growing gums will not thrive. It attains its greatest dimensions on deep black vlei land, and can stand a fair amount of moisture. This is a very quick-growing tree, yielding useful rough timber, which lasts well in the ground as a rough pole. It does not thrive on poor, shallow, granite soils, or in the extremely dry parts of the country. The tree is rather liable to go with the wind, but this applies chiefly to the broad-leaved variety. It is often crooked for the first few feet, but usually makes an excellent tree eventually. The foliage is somewhat sparse. The mature timber is reddish in colour, hard, straight-grained and very durable.

Eucalyptus saligna.—This gum requires good deep soil, prefers the granite formation and thrives best in low-lying situations where the soil is rich and deep and the roots can get to sub-soil moisture, but it will grow quite well under any ordinary good conditions. It is a very handsome tree with plenty of foliage, very quick-growing and remarkably straight. It provides excellent poles for general purposes, but they do not last well in the ground. It will not thrive on shallow soils or in the more dry parts of the country. Wood cut from mature trees should be excellent for ordinary commercial purposes, where long straight-grained timber is required, such as quartering, etc. A feature of this tree is that the bark peels off in long pieces, leaving the inner bark very white. Where this tree thrives it may be said to be the most useful of all the gums for ordinary purposes.

Eucalyptus saligna.

Eucalyptus amygdalina.

Eucalyptus botryoides.

Eucalyptus citriodora.

Eucalyptus botryoides.—This is a handsome tree with plenty of foliage and very quick-growing. It is somewhat similar in appearance to *E. saligna,* but never attains to such a large size, and the wood is slightly inferior. The leaf is larger and the tree will thrive under much more adverse circumstances, usually growing well in quite shallow sandy soil. The growth will naturally be quicker on deep soil. An excellent shade tree for street planting or shelter belts for stock. The bark is rough and brown and does not peel off.

Eucalyptus citriodora.—The lemon-scented gum is so called from its strongly scented foliage. This tree is conspicuous on account of its long white stems, very few branches and sparse foliage. The bark is remarkably thick. It can endure much more tropical heat than most gums, but is rather susceptible to frost, and usually will resist white ants. A very quick-growing tree, but rather hard to please as to situation, often growing well where least expected. It will always be a favourite on account of its clean appearance and scented foliage. Seedlings are very vigorous and consequently rather difficult to transplant. The long straight saplings are very useful for all general purposes, and mature wood should be excellent for wagon building, etc., being more pliable than most gum timbers.

Eucalyptus maculata.—Spotted gum is so called from its spotted appearance caused by the bark peeling off in patches. It is a straight, handsome tree, with thick foliage, closely allied and rather similar to *E. citriodora,* but the leaves are not scented. It is probably well suited to the better parts of Rhodesia, but there are only a few large trees growing at present. Mature timber is excellent for wagon and carriage work, and is largely used here (imported) for such purposes under the name of Australian hickory. This tree is well worthy of being more extensively tried.

Eucalyptus paniculata.—The white iron-bark gum produces the best hard durable timber of all the Eucalypts. It does not appear to have been planted much in the early days here, but there are a few very good specimens in the country. It requires a well drained situation and is hardy against drought, but very susceptible to frost. Seedlings are extremely hardy to transplant. This tree deserves to be extens-

ively tried in well drained situations fairly free from frost. Young trees seem to thrive in very varied types of soil, often growing well where it is dry and shallow, but the best timber results will probably be obtained where the soil is deep. Rather slow in growth of bole, but quick in height growth during first few years.

Eucalyptus crebra.—Narrow-leaved iron bark, and possesses timber almost identical with *E. paniculata.* It has not been extensively planted, but appears to be more hardy against frost. Somewhat slow-growing, and requires a well drained situation.

Eucalyptus robusta.—Swamp mahogany. A large-leaved gum usually requiring rather a moist situation, but occasionally doing well on high ground. Makes a very quick start, but is extremely liable to be eaten by white ants if not in a suitable situation. It does not seem likely to be long-lived here, and its timber is coarse and of very little value.

Eucalyptus calophylla.—White flowering gum. Of no value here except for its large white flowers. Only likely to make a good show on deep soil in situations almost free from frost. Would probably make a beautiful street tree in favourable localities.

Eucalyptus amygdalina.—Peppermint gum. A very quick-growing tree, producing useful timber, but when cut from young trees is not very durable. Under many circumstances it does not seem able to stand our long dry season. A few fine large trees are to be seen in the country. Will probably make a fine growth where conditions are rather good.

Eucalyptus microtheca.—Coolibah gum. A small-growing tree producing useful timber. Only desirable in hot dry situations where other gums will not thrive. Rather tender to frost.

Eucalyptus melliodora.—Yellow box gum. A new introduction, likely to prove useful in dry situations. A slow-growing tree producing good timber. Very ornamental and bushy, making an excellent wind-break. Will stand any amount of frost.

Eucalyptus sieberiana.—A new introduction which is so far doing remarkably well in dry, cold situations.

The Hygienic Production, Handling and Distribution of Milk.

By C. E. Hall,
Chief Sanitary Inspector to the Municipality of Bulawayo.

Dairy farming has in every age and in almost every country constituted a necessary and interesting department of industry. In Rhodesia this is certainly the case, and the interest in this department is not confined to one section of the community, viz., the farmer, but is shared in no less degree by the consumer. Milk, being one of the most valuable foods that man has at his disposal, demands that every precaution be taken to ensure that its production, handling and distribution are carried out in a clean and sanitary manner. Cleanliness in every process connected with the management of milk and its products is of the first importance. It is therefore from this aspect, or what is commonly known as the public health standpoint, that this article is written.

To start from the source of supply, the breed of cow, provided it is a healthy animal, concerns only the dairyman, and the consumer is interested only as to the quality of milk that the cow produces.

There is considerable difference of opinion expressed as to what standard of quality of milk can reasonably be demanded by the consumer from the dairy farmer in Rhodesia. The standard in force in the Union of South Africa of not less than 3 per cent. butter fat and 8.5 solids other than fat is a standard which the average milk yield of a herd of milk cows will easily attain to in Rhodesia. This standard does not by any means provide for a rich milk, yet it is a standard that ensures the consumer a nutritious food.

There have been records obtained of the milk of individual cows which have shewn a less percentage of butter fat than 3 per cent., and these records have been produced in support of the contention that the above standard is too high. It is questionable whether such a cow should be described as a dairy cow, and used for that purpose, but fortunately they are in the minority, and experience of those who are regularly testing milk shews that the Union standard is not too high for Rhodesia.

The dairy farmer, for the proper handling of milk, requires—

(a) a stable or milking shed;
(b) a dairy or milk-room;
(c) apparatus for sterilising and cleansing utensils;
(d) a clean and wholesome supply of water, free from liability to pollution.

The above requirements will be taken in detail, with regard to the local conditions as found in Rhodesia.

The best form of stable is unquestionably the open-fronted one, which, while providing ample shelter for the cattle, allows for the free passage of air and sunlight. An excellent plan of stable accommodation has been designed by Mr. R. C. Simmons, of the Department of Agriculture, which is planned on the open-air principle.

The stable should be paved with some impervious material, as stone or hard burnt bricks, the joints grouted with cement or concrete. The drain to carry off liquid manure should be placed so that the deposits from the cow while standing will drop directly into the drain. This drain should discharge into a catchment pit constructed of cement, situated outside the stable. It will be found that the floor of a stable so treated can be easily cleaned and kept clean, and danger of dust contamination to the milk greatly reduced.

Before milking is commenced, the cows should be brushed down, particular attention being paid to the flanks and udder. The dairyman should not permit any grooming, sweeping or any feeding with dusty forage to take place where milking is

in progress. The udder should be washed with warm water and dried with a clean towel. Objection to the washing of the udder is sometimes raised by dairymen, particularly at the early morning milking. This process by some authorities is insisted on, to ensure that filth from the udder will be removed and not fall into the milking pail. The milkers should be dressed in clean overalls, and the dairyman should personally satisfy himself that their hands and arms have been thoroughly washed before milking is commenced. No milk should be allowed to remain in the stable, but as the milking pails are filled, should be at once removed to the dairy. Natives are naturally filthy in their habits, and as the milking is usually done by them, the dairyman cannot be too particular in his supervision of the milking operation. It is in the stable, while the milking is in progress, that the risk of filth contamination is greatest.

The dairy should be well lighted and ventilated, and rendered fly-proof by means of fly-proof doors and fly-screens fitted to all openings. The internal surface of the walls should be plastered in lime or cement, and brought up to a smooth surface. The floor should be constructed of an impervious material, to allow of it being easily cleansed. If the roof is thatched, a ceiling should be constructed of some material, such as calico, to prevent dust falling into the milk and utensils. The dairy should be situated at least 50 yards from any cattle sheds or kraals. In this dairy all straining, cooling and bottling of milk should be done, and only clean vessels should be kept therein, and it should be used for no other purpose. The dairyman or some responsible person should attend to the milk as it is received from the milkers. The milk should be carefully strained through muslin or other suitable material. Every care must be taken that the filtering medium is thoroughly clean. Frequently sufficient care is not taken in this respect, and in illustration of this the following episode is worth relating:—An early morning inspection was made of a dairy, where there was a suspicion that milk was being handled not under the best of conditions. This inspection was more than justified, when the dairywoman was found straining the milk through her night dress. It is satisfactory to know that the licence was withdrawn from this woman. The milk,

after being strained, should be passed over a cooler, and then bottled or canned. The milk should be delivered to the consumer in covered carts, in a hot climate such as this, and if delivered by hand, should be carried in a wire basket made for that purpose. The dairyman who uses a cooler will find that milk so cooled will keep sweet five to six hours longer than milk not so treated. This is an obvious advantage in itself, which should commend the use of a cooler.

All utensils should be of such material and of such type that they can be easily cleaned. The inside should be smooth and free from seams, and the inside edges sufficiently rounded to obviate the possibilities of any dirt lodging there. The utensils and vessels, immediately after use, should be rinsed with cold water and then thoroughly cleaned with boiling water or steam. A convenient form of boiler for the small dairy farmer, for providing boiling water quickly, can be made by building in a petrol drum lengthways with provision for a fire underneath. The drum should be provided with a draw-off tap, and a funnel for filling it with water. For larger dairies, a proper sterilising plant should be installed. As soon as the vessels and utensils have been cleansed, they should be placed in the dairy, to prevent them being fouled by dust and flies.

The water used for dairy purposes must be from a supply free from liability to pollution. It is of little use to exercise care in the handling of milk if the water used for the final cleansing of the milking utensils is not pure and wholesome. Should the dairyman have any doubt as regards the purity of the supply of water, he should use it only after it has been boiled.

The character of the dairyman is a factor which deserves consideration, for it will be reflected in the manner in which he maintains his dairy premises. The majority of dairymen are men of good type, who earnestly desire to carry on their business on the best lines, and are always open to receive suggestions and recommendations for the better working of their dairies. In spite of difficulties which only dairymen and those connected with them know, they recognise their responsibilities when supplying to the consumer an article of food so easily contaminated as milk. On the other

hand, the careless, inefficient and filthy dairyman is found. Under whatever heading he comes, he is a menace to public health and a danger to the community. He milks in a filthy kraal or stable, littered with manure. No attempt is made to clean his cows, or to supervise the milking. His only object in straining milk is to remove lumps of manure and flies that have fallen into the milking can during the process of milking, or when the full can was standing in the kraal, the presence of which would render his milk unsaleable. Dairymen of this description, and there are such, should be shewn no consideration, but should be prosecuted into cleanliness or out of the business.

This article has been written with the hope that it may contain suggestions which will be of assistance to dairymen purveying or proposing to purvey milk.

The Salisbury Bacon Factory.

By F. Eyles, F.L.S.

The Bacon Factory established in Salisbury by the British South Africa Company has now been in operation since October, 1914, or a little over one and a half years. That it has been a benefit to all parties affected by it may be taken as proved by the increasing degree in which it is being patronised by producers and consumers alike. The factory was originally intended to handle twenty-five pigs a week, but at the time of writing an average of seventy pigs is killed weekly, which has been made possible by the addition of an extra drying room; surely a sufficiently satisfactory result of less than two years' working, especially when we remember that the pig-breeding industry was in a moribund state when the factory started, and first had to be resuscitated.

Many farmers who are receiving their regular cheques from the Company, or who are prospective contributors to the factory, have had no opportunity of making a personal inspection of the establishment, and they will probably welcome a brief account of the manner in which the business is run and what its prospects are. This I will endeavour to give without attempting an exhaustive descriptive article.

A special spur from the main railway line runs into the factory yard, by which means the pigs are delivered direct from the station of despatch without any second handling. This reduces to a minimum the loss incident to the transport of animals by rail, and ensures their being received in a condition almost as good as when they left home. From the trucks they are transferred to a yard which they are allowed to use when they have to be detained a day or two before

slaughter, but generally they are killed within twenty-four hours after arrival. Opening on to the yard, but attached to the main building, are well-built styes for the accommodation of those awaiting treatment. These styes lead into the catching pen, where each animal as it comes out has a short chain sling put round one hind leg. The sling is attached by a hook to an overhead pulley running on a rail, and the pig is immediately swung off his feet, and, hanging head downwards, is run forward into the sticking pen until he is over a large grating in the floor. Here the knife is used and the blood falls into a tank beneath the grating. Death is very quick, so that a few seconds after leaving his stye, the live animal has become meat and is ready to be lowered into the scalding vat, which is done direct from the sticking pen. The pigs follow one another very rapidly, so that there are soon several hanging at once in the sticking pen. As soon as the body reaches the scalding vat, natives set to work scraping off the hair, which does not take many minutes, and by an ingenious arrangement the carcase is then lifted on to a large table where the scraping and cleaning of the skin is completed.

From the table the carcase is again raised by a sling attached to a pulley running on an overhead rail. It is run along to a place convenient for the butcher, who now performs the process of opening and cleaning. This finished, it is transferred, still depending from the overhead pulley, to an overhead scale where the dead-weight is taken, thence to the air-lock, and later from that to the chilling room. This prevents the cooling off of the carcase from being too rapid. After a period in the chilling room, it is cut up and shaped into bacon and hams. These are placed in the curing cellar and there cured according to those recipes that have made Rhodesian bacon well known for its high quality. Last of all, the sides and hams, when the curing is perfect, are washed to remove superfluous salt, and then put into the smoke chamber, and when they leave that the whole process is complete. Pending sale, everything is kept in the large, cool store room, which has been added to the building since it was first erected. When I visited the store room I had just been told that seventy pigs were killed weekly, and it was with some surprise I noticed that the room contained little more than a dozen sides of bacon. All the rest had been sold.

The finished products when they leave the factory come under the following heads:—Bacon, long-cut sides, three-quarter sides, middles and boneless rolls; hams, long-cut, and picnic hams; sausages and lard. The lard is sent out in one-pound, five-pound and thirty-five-pound tins, as well as in bladders. About ten months ago the manager secured 15,000 one-pound tins for lard. I saw in the store room a pile of a few hundred full tins ready to go out, and I was informed that these were the last of the 15,000. This indicates that business is brisk and good money is being kept in the country. At present the bulk of the factory produce is absorbed by Salisbury and the district and towns within a certain radius of the capital, but Northern Rhodesia is a regular customer, and Matabeleland takes some bacon. No special efforts are made to extend the business further afield, and probably it would not be wise to do so until the capacity of the factory has been increased and a larger supply of pigs can be steadily relied upon.

I asked the manager why it was that the Salisbury bacon compared so favourably with that produced elsewhere in South Africa. His reply was that he believed the system of feeding and the quality of pig handled here were superior to those obtaining in the South. In fact, in many instances the quality was not inferior to that seen in England. I enquired if his experience here had led him to pronounce in favour of any particular breed as being the best for Rhodesia, but he said he had found that any of the standard English breeds, if properly looked after, gave good results. It was the half-bred Kaffir pig that was always disappointing.

Since the factory started, as a result of experience and care, there has been a great improvement in respect to regularity in size of the pigs as delivered, and recent consignments have been most satisfactory in this respect. It may not be generally known that all pigs are graded at the factory, and prices paid according to grade. At present the best grade fetches 5d. per lb. live-weight, and the second grade 4½d. per lb. When anything less than 4½d. is paid, there is generally some special reason. Old sows are worth little, and boars and stags are not wanted by the factory at all. By a stag is meant a boar that has been cut within, say, a couple of months before

Interior of Bacon Factory, Salisbury.

slaughter. It is most important that all pigs for the factory should be cut not later than at weaning time, and preferably a week earlier.

I enquired whether local experience had proved any particular system of feeding to be the best from the bacon curer's point of view. It has been found that for firmness of flesh and all-round good quality, nothing surpasses the pigs that have been fed on a mixed diet which includes a good supply of milk. Where milk is not available, the same results can be obtained by using a generous ration of lucerne. A feed consisting almost wholly of mealies and lucerne has produced excellent bacon. On farms where neither milk nor lucerne is obtainable, first-class pigs have been grown when boiled roots have been fed and the mealies mixed with the boiled mess. The manager also spoke well of the effects of making the ration as mixed as possible, by the use of peas, dhal, beans, sweet potato tops, buckwheat, etc.

The staff of the Bacon Factory at present consists of Mr. G. Neill, manager, the butcher and another white assistant, together with about fourteen natives. Although Mr. Neill attributes the high quality and popularity of Salisbury bacon to the good stamp of pig and the careful feeding in Rhodesia, it cannot be doubted that the element of good management and personal skill must be an important factor when it comes to turning the pig into bacon, and the credit for this must go to Mr. Neill and his staff.

Crops Unsuitable to Southern Rhodesian Conditions.

By J. A. T. Walters, B.A., Assistant Agriculturist.

The crops mentioned in the subjoined list are those that our experience at the Botanical Experiment Station, Salisbury, and elsewhere, over a number of years, has shewn to be entirely unsuited to Rhodesian climatic conditions, or to be economically unprofitable for the Rhodesian farmer. The list is given with a view of indicating some crops that are probably not worth attention on the farm in the ordinary way, and will, it is hoped, serve as a guide, inasmuch as merchants' advertisements frequently lead one to suppose that some particular crop advocated by them is certain to be a success. Although the pronouncements in any case must not be regarded as absolutely final, no crop is included which has not been thoroughly tried under varying conditions.

Legumes.—The most important legumes which have consistently given disappointing results are the clovers. Every effort to grow profitable crops of the common clovers of Europe has been unsuccessful. Similarly other clovers, such as Japanese clover (*Lespedeza striata*), Strawberry clover (*Trifolium fragiferum*) and Subterranean clover (*T. subterraneum*), have not been sufficiently promising to warrant their recommendation to farmers. The only exception has been the Egyptian clover, a strictly annual variety, which has given moderate returns as a summer crop.

Other legumes which have failed to be economically useful are the following:—Soy beans (*Glycine hispida*) are a crop which makes good plant growth, but has never produced a payable return of grain, the best recorded yield per acre being

under two bags. Cowpeas (*Vigna catyang*), though occasionally giving a fair crop, are found to be very subject to the attack of the stem maggot in the early stages, and of weevil in the grain at harvest. None of the Vetches (*Vicia spp.*) make sufficient plant growth, either alone or in combination with other fodders, to warrant their use. Most varieties of Lupines (*Lupinus spp.*) have failed to grow readily, although they are excellent nodule producers when they can be induced to grow. No success has been obtained with Sainfoin and Sulla, two fodder plants of great potential value for winter grazing, even after many years' trial. Maple pea, a grain crop used particularly in the feeding of pigeons, has never given any considerable yield in our trials. Tangier pea (*Lathyrus tingitanus*), a perennial fodder plant, is unable to survive the winter drought or to set seed satisfactorily. Liquorice (*Glycyrrhiza glabra*) has always shewn poor germination under a variety of conditions. Tree lucerne (*Medicago arborea*) and Tagasaste (*Cytisus proliferus*) have never made normal growth on the prevailing red soil of the country, remaining as a rule stunted and ill-grown, and falling an easy prey to the attacks of white ants. In certain favoured situations they have done better, but are not to be recommended, as they cannot be relied upon.

Grasses.—It may be stated that, with the exception of Paspalum, Teff and perhaps Sudan and Molasses grass, exotic grasses have not done well under Rhodesian conditions. As a rule the winter drought proves a serious obstacle. Grasses have been introduced with two objects in view: to provide summer hay crops superior to our native grasses, or to afford green winter pasturage when the native grasses are not available. Among the most notable failures are the Mitchell grass (*Astrebla triticoides*) and Blue grass (*Andropogon sericeus*) of Australia; all the English and Continental grasses; the Tall fescue (*Festuca arundinacea*) of New Zealand, and most of the American prairie grasses.

Crucifers. This important class of agricultural crops, comprising cabbage, rape, kale, kohl rabi, cattle radish and turnips, may be said to be a complete failure under summer conditions in Rhodesia. This failure is, however, not due to the unsuitability of these plants to the climate, but to the

attacks of numerous pests on plants that would otherwise make a healthy and normal growth. Rape and kale in particular often make excellent growth before they are subjected to the devastating attacks of aphis.

Miscellaneous Crops.—Hops of different varieties have been regularly tried without success. The origin of the sets, however, has consistently been England, and it is possible that Californian or Australian sets might meet with a greater measure of success. Saltbushes (*Atriplex spp.*), more particularly the Australian varieties, have systematically failed in spite of having made satisfactory growth in certain portions of the Transvaal, Free State and the Cape. Sugar beet has given disappointing results in weight obtained per acre, and is not to be recommended as a root crop as a source of sugar nor for feeding purposes on this account. Jerusalem artichokes have also been unreliable in most cases, although some success has been reported by farmers. Teosinte (*Euchlæna mexicana*) makes fair growth and might be usefully employed for ensilage, but is hardly comparable to the mealie, which gives an equal growth of foliage together with a heavy crop of grain. Arrowroot (*Maranta arundinacea*) was propagated from roots some years ago, but the plants have made no progress, and the original plot has now been reduced to one plant. Canaigre (*Rumex hymenosepalus*). This tanning plant was one likely to give good results under Rhodesian conditions. No useful stand has, however, ever been obtained on our trial plots. Karroo bush (*Pentzia virgata*). Imported roots have grown with much vigour during a long series of years, but, although the plant flowers freely, no seedling plants have appeared, and the original plots are gradually diminishing.

Artificial Fertilisers and the War.

By A. G. Holborow, F.I.C.,
Assistant Government Agricultural Chemist.

This year the great war in Europe is again responsible for additional shortage of fertiliser materials. Sulphate of potash, when hostilities were commenced against Germany, was no longer obtainable from the huge natural deposits at Stassfurt, and consequently in artificial compound fertilisers in which it occurs this material had to be proportionately reduced. The price of potash having seriously risen, the reduction in the quantity used in a dressing became necessary in order that the price of the fertiliser should remain unaltered without materially affecting its manurial value. We are now given to understand that further difficulties have been thrown in the way of mixers of artificial manures. This time it is double superphosphate which is difficult to obtain. Nitro-glycerine, the basis of high explosives, is prepared by nitrifying glycerine with sulphuric and nitric acids. Most of the sulphuric acid now manufactured is required by the explosive factories, and the natural result is that there is not sufficient for other industries. Of these, the one which affects us most as agriculturists is the manufacture of superphosphate. This compound is obtained as the result of the action of sulphuric acid upon bones or other sources of tricalcic phosphate. By this method the phosphoric oxide, which before treatment was in a form which is insoluble in water, has become soluble and at once easily available by the plant. This demand on sulphuric acid for the purpose of manufacturing explosives at the expense of double superphosphate has caused the price of this fertiliser to be seriously enhanced.

Phosphoric oxide, like potash and nitrogen, is one of the essential elements which sustain plant life, and when it occurs

in the water-soluble condition its value is immediate. The chief source of water-soluble phosphoric oxide in this country is double superphosphate, and it is with some degree of apprehension that this shortage of superphosphate is viewed. The question which arises is in respect of the proportion of water-soluble phosphoric oxide which will be found in compound fertilisers this season. Let us take the case of Rhodesian maize fertiliser. This artificial manure was originally compounded to agree in composition with a formula laid down by Mr. G. N. Blackshaw, Agricultural Chemist in the Department of Agriculture. The formula referred to was found by exhaustive field trials to give profitable returns in maize on red diorite soil. It consisted of the following ingredients, to be added per acre:—

35 lbs. nitrate of soda per acre
65 lbs. double superphosphate per acre
25 lbs. sulphate of potash per acre

These supply—

nitrogen, $5\frac{1}{4}$ lbs. per acre
phosphoric oxide (water sol.), $27\frac{1}{4}$ lbs. per acre
potash (K_2O), $12\frac{1}{2}$ lbs. per acre.

Let us now see to what extent it has been found imperative to modify the above formula on account of shortage of materials. Whilst maintaining the price of the fertiliser under consideration, the best than can be done is a reduction in the water-soluble phosphoric oxide to 5 per cent., at the same time increasing the undissolved phosphoric oxide from 2 per cent. to 10 per cent. The percentages of nitrogen and potash remain the same as last year at $2\frac{1}{2}$ per cent. and 2 per cent. respectively. Allowing a dressing of this modified fertiliser of 150 lbs. per acre, we arrive at the following amounts of the individual ingredients which the altered dressing contains:—

Nitrogen	3.7 lbs.
Phosphoric oxide (water-soluble) ...	7.5 lbs.
Phosphoric oxide (undissolved)	15.0 lbs.
Potash (K_2O)	3.0 lbs.

Let us carefully consider what this reduction in the amounts of the ingredients may mean. It has been demonstrated on

previous occasions that a fertiliser dressing mixed in accordance with the formula of the Agricultural Chemist has given remarkable profits if applied judiciously to maize. Our last season's field experiments gave us the following results:—

Yield of grain per acre, average two plots.	Increase due to manuring.	Value of increase at 8s. per bag of 200 lbs.	Cost of dressing, pre-war prices.
3,293 lbs.	1,232 lbs.	49s. 3d.	20s.

The average of three unmanured plots was 2,061 lbs. Resulting from the application of the original dressing of fertiliser costing £1, it will be seen that a profit of 29s. 3d. per acre was obtained.

For the coming season, allowing that the cost of the dressing for the sake of comparison is approximately the same per acre, we can calculate that the reductions in the amounts of nitrogen, water-soluble phosphoric oxide and potash are:—

Nitrogen	28 per cent.
Phosphoric oxide	72 per cent.
Potash	76 per cent.

whilst the undissolved phosphoric oxide has been increased 500 per cent., *i.e.*, five times as much as previously. Such, then, is the result of the increasing difficulty in obtaining fertiliser materials.

It occurs to the enquiring mind whether the modified dressing can be applied with profitable results, and if so, to what extent that profit is. The writer is unable to answer with any degree of certainty. It is clear that a profit of 29s. 3d. cannot be expected, as in the case of the original dressing obtained last season and referred to here. The modified dressing may pay for itself by the value of the increase in the yield, with something to spare, but as no field trials have yet been conducted with the dressing in question, the writer refrains from expressing himself either for or against the expediency of applying it to maize.

This article has been written to place before the farmers of Rhodesia the conditions of the fertiliser market, so that they may have some idea of the reasons why fertilisers are expensive to-day and the difficulty they may be confronted with in this connection in the future.

The Marketing of Poultry Products.

By Frank Sheppard.

The Live Stock and Agricultural Statistics for 1915, published in the April *Agricultural Journal*, again shew a very poor return of eggs marketed. Although several districts shew an increase over 1914, there are many which shew a decided falling off, and the total figures are very little better than last year. These poor figures are largely due, no doubt, to the various reasons put forward in the article referred to, but it may fairly be said that the statistical table does not really shew the egg production of the country, because the column for "eggs sold" has no relation to the column for "poultry kept," for the latter includes the many cases where large numbers of birds are kept, but no eggs ever sold. Therefore, any average based on these two columns would be misleading.

To enable the many producers of poultry products who are unfavourably situated as regards a market to come into touch with the consumers of either eggs or table birds, organisations run on co-operative lines are essential, and until these are established we cannot expect any very great increase in our poultry returns. An organised system of dealing with poultry produce is the key-note to success, and till the existing prejudice against co-operation is broken through, there will be little improvement in the returns from many of our districts.

Whatever the poultry keeper's knowledge may be on the subject, and however successful he is in rearing chickens and producing eggs, it is impossible to obtain an adequate return unless he has some ready means of reaching the consumer. The conservative spirit is a most powerful obstacle to the co-operative movement, but when once it is realised that co-operation tends to secure an adequate reward to labour, then we shall

see many more co-operative societies and egg-circles in the country than we do at present.

There are many farmers, I am afraid, who have a great objection to any organisation which compels them to combine with their neighbours, but why this should be is difficult to explain. It may be jealousy, or it may be the dislike of their neighbours knowing the extent of their business. We find this objection to co-operation in every country, and yet co-operative movements are making great headway. On the Continent rapid strides have been made during the last few years, chiefly by Denmark, where the system of co-operation has made such enormous development and reached such a high state of excellence that we find the eggs sent to the London markets through the Danish Farmers' Co-operative Export Association are fresher, better graded and fetch higher prices than Irish eggs.

In Australia we find not only the small producers of poultry products combining, but also the professional poultry farmers. In a paper read by Mr. W. E. Hyndman, Chairman of the Poultry Farmers' Co-operative Society, before the annual conference of poultry farmers at the Hawkesbury Agricultural College, Richmond, New South Wales, the many benefits of co-operation were pointed out. It was said that although the society had passed through troublesome times at the start, good management, thorough organisation, straight dealing and studying the wants of the consumers eventually won the day, in spite of ignorance and the conservative spirit, which were the two chief enemies of co-operation.

Not only would a system of co-operation enable poultry keepers in scattered districts to dispose of their produce, but it would encourage others to take up poultry keeping on a larger scale when they realised there was a ready market paying good prices. There are at present, I know, many farmers who keep a few birds to supply eggs for home consumption only, owing to the present difficulties of marketing. The writer does not for one moment pose as an expert on co-operative systems, but the mere novice can easily realise the many advantages to be gained by co-operation in some form amongst the scattered

population of some districts in Rhodesia for the disposal of eggs, table birds and perhaps other perishable goods.

To ensure the successful management of a co-operative society, its chief objects should be:—(a) The organisation and development of the poultry industry as a most important branch of agriculture; (b) the improvement of quality and increase in quantity of eggs, poultry, etc.; (c) the maintenance of regularity and uniformity of supply; (d) provision of facilities for rapid and regular transport; (e) the bringing of producers and consumers in close touch in order that the best available prices may be obtained with minimum handling charges; (f) the buying of poultry foods; (g) and last, but not least important, the right man at the head of affairs. The buying of poultry foodstuffs on co-operative lines will not be regarded as of much importance by the majority of the farmers, as they are practically self-supporting in this line, but there will doubtless be some instances where the buying of a portion of the foods on co-operative lines would prove satisfactory. Although the chief business of a co-operative society would be in dealing with eggs, table birds should also be marketed, and it might be found satisfactory for a range of fattening coops to be erected at the collecting station, where suitable birds could be fattened before being disposed of. There is one more branch of poultry keeping that can be run on co-operative lines, that is hatching. The co-operative system of hatching has not made equal headway in all countries, but it has been carried out most successfully in France and Denmark for many years, and has proved a great boon to farmers who have neither the time nor means to devote to artificial incubation. They are thus able greatly to extend their operations without any outlay of either time or capital. Not only would co-operation encourage poultry keepers to produce larger and more eggs, but it would also encourage the breeding of suitable table birds, which are practically unknown here at present.

We cannot take the exhibits of table poultry at the Salisbury Fat Stock Show in December last as an example of Rhodesian table birds. Although the turkey classes were well supported and many really good birds were penned, the poultry classes were most disappointing. The exhibits consisted of

under-sized White Leghorn and Rhode Island Red cockerels, ancient, scaly-legged White Wyandotte type of hens, and a few White Leghorn-something crosses more resembled a three-shilling selling class at a village show than table birds.

At present there is little inducement to produce good table birds, which would be sold by weight, but I see no reason why the Bacon Factory should not encourage and combine the table poultry trade with the pig industry. Suitable table birds could be bought from the breeders at a certain price per lb., just as pigs are bought. If this were done, I feel sure it would greatly encourage and increase the breeding of a better table bird, just as the establishment of the factory has greatly increased the breeding of suitable pigs. A few farmers, I know, are at present producing good table birds, and the recent arrival of an Indian Game cockerel, which survived the dangers of the war zone and the South African railways, and passed through my hands on its way from England to Mazoe, shews that there are others who intend taking up this branch of poultry keeping on proper lines.

Why the number of birds in the country should have decreased since 1914 is difficult to understand. In other countries where, owing to the war, the price of poultry food-stuffs has increased, in many cases 50 per cent., we can expect to see the industry severely checked, but in Rhodesia the usual rise and fall of the poultry food market has been similar to previous years. Although the poultry returns can hardly be expected to be accurate, they give us a fair idea of the state of the marketing of eggs. The reasons for these poor returns are many, but I am sure that the birds themselves are in no way to blame. There are any number of really good laying and breeding birds in the country, and although I have little opportunity of visiting many farms, I have seen several flocks of farmers' birds in the Salisbury and Mazoe districts of good healthy laying type, free from native blood, which, if properly treated, should give good results. What we want in order to increase and improve our poultry returns and bring them more up to the standard of other countries is not more birds or better birds, but better management, more business-like methods and better organisation amongst poultry breeders.

Notes on Propagation by Means of Cuttings in Rhodesia.

By F. B. Willoughby,
Superintendent, Government Forest Nursery, Salisbury.

Most of our ornamental shrubs, climbers, roses, etc., grow very readily from cuttings. Seeds should always be preferred when obtainable.

As there are practically no glass houses in the country, I will not deal with propagation under glass. If it is desired to strike cuttings in a "limbo" house, the tins should be placed as near the roof as possible, so that they will be near the light, and consequently the growth will not be drawn. July seems to be the best month for taking cuttings. The plants are then dormant. They must always be taken before the spring growth starts. Some plants will be found to strike very readily in July and yet be almost impossible to strike at any other time. The only plants that do not seem to strike readily in July are those that have very soft wood. January is also a good month for taking cuttings. The first flush of spring growth is then completed, and the autumn growth has not started.

The best results are usually obtained by making cuttings about 6 inches long. Roots spring most readily from a joint, and it is, therefore, a common practice to cut off the base just below a bud. When cutting the upper end, leave at least an inch of wood above a bud, as in this country the wood always dries out a little, and the bud often dries out too if the wood is cut too close. A good sharp knife is the ideal tool for making cuttings, but seccateurs are often used. Great care must be taken to get a nice clean cut at the base. Use good clean firm wood of the previous season's growth.

When planting, not more than 2 inches should be left out of the ground, otherwise the cuttings will dry out before they can make roots. The base should not be more than 4 inches below the surface, so that no part shall be beyond the influence of the air and the heat of the sun. For this reason, when planting in beds, cuttings are often laid at an angle in order to bring the base nearer the surface. It is more satisfactory to make a short cutting and plant it straight up.

Strike cuttings in sandy soil or pure sand. They will then callus readily. As soon as they have made a nice growth of leaves, which will be in about a month or six weeks, they must all be transplanted into good soil whether they have made roots or not. If sandy soil is not used to strike the cuttings in, there is usually a very large percentage of failures owing to their damping off.

The most satisfactory way to grow cuttings is to plant them in half paraffin tins. Put about 3 inches of sand in the bottom of the tin. Push the cuttings into the sand about an inch so that they will stand up, placing them about an inch apart. Then pour sand over them until only about 2 inches of the cuttings are left exposed. About fifty can be placed in a tin. Water thoroughly and stand the tins in a very warm place fully exposed to the sun. Then stretch tobacco muslin about 6 inches above the tins. This will give them as much heat as possible, while protecting the young growth. Water regularly through the muslin, but do not drown them. Transplant into good soil as soon as they have made a strong growth of leaves, especially if they are beginning to damp off.

Review.

A BOOK ON OIL CROPS.

The Imperial Institute is ever active in encouraging agricultural interests throughout the Empire, and is now issuing a valuable series of monographs dealing with the prospects of new British industries as a result of the war, having as the ultimate object the capture and retention of trade which has been allowed during years past to slip into the hands of our present enemies. One of these little works, dealing with oil seeds and feeding cakes, published by John Murray, of London, at 2s. 6d. net, and with a preface by Dr. Dunstan, the Director of the Imperial Institute, is of peculiar interest to the Rhodesian farmer. The book deals with the commercial aspects, mainly, of a number of oil crops grown throughout the tropic world: copra, palm kernels, ground-nuts, sesame and mowra. Of these it is ground-nuts that particularly interest us; and, on account of the exhaustive way in which this subject is dealt with, the book should be read by all prospective growers of that crop in Rhodesia. It is impossible here to give all the valuable information on the subject contained therein, but a few points may be quoted and readers referred to the work itself for further information.

The present annual supply of ground-nuts in normal years to Europe for manufacturing purposes is estimated at 600,000 tons. Owing to the war there has been a diminution in the demand, which, however, there is every reason to anticipate will be more than recovered on the return of peace. It is interesting to find that in India the question is under consideration of establishing crushing mills in that country; we in Rhodesia have already, if on a small experimental scale, our oil factory, which deals almost exclusively with ground-nut oil. It would have been interesting to find the usual acreage yields in various parts of the world for this crop, but these are not given, though in India we read that the average harvest is in the neighbourhood of 1,000 lbs. per acre.

Regarding the uses of ground-nut oil, it is stated that the lowest grades are employed mainly for soap making, and that it is largely employed in the manufacture of margarine, for culinary use, for preserving sardines and for other industrial purposes, and occasionally as an illuminant. An important point not fully appreciated in this country is that ground-nut oil is non-drying, and can be used as a lubricant. Elaborate tables are given of the trade in ground-nuts and the value and analysis of oils and the cakes derived from the nut. It is to be regretted from our point of view that the subject of the cultivation of this crop, its preparation and utilisation have not been included in this book, and that the reader is only referred to bulletins of the Imperial Institute of 1910 and 1913, which are of course not readily accessible to the ordinary reader. Had these been re-published, even in condensed form, we think it would have added very much to the value of the book under review, as it would then have brought together the entire information on the subject and made the work equally useful to grower, manufacturer and merchant. This little book also deals with sesame, a crop which is still in the experimental stages in this country, but which it is hoped may some day be successfully grown here also.

E. A. N.

Correspondence.

THE MONKEY-NUT.

To the Editor,

Rhodesia Agricultural Journal.

Sir,

Reading a previous article in your *Journal* by Mr. Mundy about the monkey-nut, I decided to put in a small patch, four to four and a half acres, on medium poor veld. I have just reaped them, and have sold and delivered eighty-seven sacks and retained fifteen for pig feed. Had there not come on a three days' rain during reaping, I should have had another fifteen to twenty sacks. Spanish Bunch was the variety planted. There were one or two ant-hills which would have grown good mealies, but they produced practically no nuts, the soil not being loose enough, and when the plant was pulled up, earth had stuck to the few pods produced, and had to be literally scraped off, which would not pay. The point is that the nuts did better on the poorer soil, and gave an excellent return considering the drought we have had.

I have kept a careful account of expenses incurred for the four acres, and it is £10, as near as possible, made up as follows:—£1 an acre to put in, £1 an acre to reap, and £2 more than covers cultivating and cleaning the lot. I have not included my personal supervision in expenses, and usual costs of ploughing and harrowing must be added.

When the crop has been several days in flower, the flowers will drop, and at this period (it is not very important to a day) natives should be sent along the rows with their badzas, and soil to the amount of two double handfuls dropped on the centre of each plant. This ensures every flower maturing to a pod, and makes sacks difference in the yield per acre. A native will easily do half an acre a day, and, apart from this and pulling up the weeds once by hand, the crop need not be culti-

vated or touched between planting and reaping. Other advantages of the monkey-nut crop, besides the ease with which it is kept clean, are its freedom from attack by disease, baboons, jackals, etc.

There are hundreds of sand-veld farms which are perfect for growing this crop, so why is it neglected? Farmers keep on striving against nature, with expensive fertilisers, etc., to grow mealies on poor land that is unsuitable, when they have the ideal ground at hand to beat, by growing nuts, the return in value of the best mealie land.

Mr. Mundy tells us that 359,296 tons (not sacks) of monkey-nuts were imported into Marseilles in 1912. There, then, is our market for exporting them. Although for the present that market may be closed to us for freight reasons, we still have a local market. While in Salisbury, I went to the Oil Factory and was surprised at the excellent products being turned out from monkey-nuts, such as oil, soap and oil-cake. I bought a quantity of soap, and my wife tells me it is equal to the imported, but much cheaper. It is made up in various saleable forms for toilet and kitchen use, down to Kaffir soap. I am told that the demand exceeds the supply many times over, and no wonder, because the products were well-nigh perfect of their kind. Why should the demand exceed the supply? Isn't it a sound business proposition to increase the plant, as there are so many surplus nuts in the country? Personally, as the crop gives such a heavy return, I am putting in 200 acres this season, and will find a market the best way I can. I am also told that it is impossible at present to procure the necessary machinery from Home to cope with more than 7,000 bags a year, but that can be only a temporary difficulty, and it is urgently important to give the ground-nut farmers a reliable market. I feel sure that in a short space of time the monkey-nut will compete with the mealie for place as the premier crop of the country.

I have another small patch of nuts planted later, and these during January and February did not receive a spot of rain, and yet they are quite green even now. Monkey-nuts are a great drought-resister, and that alone is half the battle in this country. Then again there is the very great difference

between the quantity of nourishment the mealie takes out of the soil compared with the nut, easily eight to ten times as much. The weight of a full-grown mealie plant is three and a half pounds, including leaves, cob, stalk and clean root. The weight of a monkey-nut plant in the same condition is six ounces. When weighing, both plants were just on the turn to dry off, and the largest of each kind I could find was taken. The small amount of nourishment taken out of the ground by the nut would be nearly returned before next season's planting.

The prejudice against this crop may be due to the difficulty of reaping the running varieties, but since the Department of Agriculture has introduced bunch varieties of superior cropping power, there should now be no difficulty on that account. The Spanish Bunch pods can be pulled off with one snatch, as the pods droop together on the plant being held up; whereas nuts of the running kind have to be pulled off singly.

It should be a very small outlay that would be required to put up a larger factory plant, thereby placing the crop on a basis that would warrant farmers planting the monkey-nut extensively, with the following advantages to the parties concerned:—(1) Enabling present owners of sand-veld farms to grow a paying crop, which it is quite impossible for them to do at present. (2) A ready market for that class of farm would be found, which people now fight shy of. (3) The public would be encouraged to buy local products at cheaper rates, and consequently less of the imported articles, with further benefits to ourselves by keeping money in the country. (4) Fair profits to the factory from articles manufactured by increased plant. (5) Giving the farming industry an all-round stimulant, especially the hard-hit tobacco growers, tobacco soil being ideal for the monkey-nut.

C. E. Tulley.

Norton, 26th April, 1916.

[Note.—Mr. Tulley's letter is interesting and valuable, but it is right we should make the following comments:—(1) In regard to the Marseilles market, we are doubtful if Rhodesia, with its long and expensive rail transport to the coast, will at present be able to compete in the European

market. (2) Our information is that baboons, jackals and buck, not to speak of porcupines and wild pig, are all very fond of monkey-nuts. (3) The effect of a crop upon the soil in which it is grown cannot be decided solely on the weight of its total vegetative growth. As a matter of fact, in what may be called "the pea-nut belt" of the United States, this crop is never planted two years running on the same land. A 50 per cent. drop in the yield would result. (4) We cannot endorse Mr. Tulley's opinion that monkey-nuts require only one weeding.—Ed., *R.A.J.*]

MAIZE COB FODDER.

To the Editor,

Rhodesia Agricultural Journal.

Sir,

In view of the probable large deficiency in the yields of the maize crop throughout the country owing to drought, the following extracts from the "Queensland Agricultural Journal" on "Cobs as Fodder" should prove of special interest, more particularly to those farmers raising pigs and with pedigree stock to feed through the winter months:—

"The Director of Agriculture for Queensland, replying to a correspondent, says:—'Cores by themselves possess little food value, but it has been found in practice that the best results are obtained by grinding the cores and cobs into a fine state of division for the reason that maize meal by itself is too concentrated.'

"The subject of ground corn-cobs as a food for stock has given rise to much controversy, especially amongst the farming community in the United States of America, some farmers asserting that once the grain is removed the cobs are of no value, while others quite as positively assert that they possess high nutritive value. As there are many tons of cobs annually thrown away or used instead of firewood in this country, it becomes a matter of very great importance to farmers to know whether they are thus destroying a valuable fodder material,

or whether the cobs are, as has been supposed, absolutely useless as feed for stock.

"To decide this question, the Department of Agriculture (Queensland) requested Mr. J. C. Brunnick, Chemist to the Department, to furnish an analysis of the corn-cob, and shew its value and properties as a fodder. Mr. Brunnick accordingly supplied the following information, from which it will be seen that, taking the comparative food values, commencing with corn as 100, of certain food materials, lucerne hay comes second and corn-cobs third on the list, corn-stalks fourth and potatoes fifth:—

"Report by Mr. J. C. Brunnick, Agricultural Chemist, on the Value of Corn-Cobs as a Food.—Corn-cobs as well as corn-stalks have a considerable value as food, as shewn by the following analysis:—

	Albuminoids. per cent.	Digest. Nutrients (Carbohydrates). per cent.	Fat. per cent.	Comparative Value.
Corn-cobs from ...	.6	41.7	.2	37
,, to	1.1	43.2	.4	49
Corn-stalks	1.1	37.0	.3	36
Corn (maize)	8.4	60.6	4.8	100
Potatoes	2.0	21.8	.2	26
Lucerne hay	9.4	28.3	1.0	65

"Professor E. W. Stewart in his 'Feeding Animals' recommends strongly to pass the whole corn crop—stalks, ears and all—through a large cutter and reduce it to a fine chaff."

Yours, etc.,

WALTER H. SWAIN.

Premier Estate,
14th March, 1916.

A DEFENCE AGAINST WEEVILS.

To the Editor,

Rhodesia Agricultural Journal.

Sir,

For the information of any of your readers who know of no simple method of treating mealies with a view to storage and comparative safety from weevil, I am forwarding the following details of a native treatment well worthy of trial which has saved me much anxiety and worry.

If mealies are free from weevil and it is desirous of storing in bulk, see that all mealies are thoroughly dry and the store absolutely free from weevil. Make sure on these two points, then give a thorough mixing of fresh wood ashes right throughout the mealies, close everything as tight as possible, and smear with a good coating of fresh cow dung to render air-tight; this latter when dry, if properly put on, forms an absolutely air-tight cement, sufficient to prevent the weevil from penetrating.

If storing in sacks in open shed, use the ashes in same way, and spread thick layer over every portion, outside as well. For home consumption I have the sloping outside parts of sacks slightly—only slightly—damped to hold the ashes, which are rubbed in and more ash thrown over the rubbed portion. To smear these with cow dung is also good, and makes a more certain job.

Should the weevil be already in the grain, turn the mealies out, turn the sacks inside out, beat them well and re-bag with a thorough mixing of fresh ashes. If grain can be left out during day (the hotter the better) before re-bagging, the weevils will all be seen clearing out, and what are left will very soon get to the outside of bags, when they can be constantly brushed off before stacking for a day or two, or, if wanted to be re-stacked at once, have sufficient ashes to give a good coating to every portion of the outside of all sacks, and if properly done very little further loss will result. The natives maintain that the outside coating of dung alone will keep the weevil out if the grain and bags are free and the bags made air-tight. The ashes, if good and fresh and in sufficient

quantity, will drive the weevil to the outside, as they choke the weevil.

Locally, in all cases where mealies have been treated in this manner, the natives say they prefer to cook and eat the mealies without separating the ashes from them. At first I used to have the mealies winnowed by the usual method, but stopped doing so at the natives' request, and now both mealies and ashes, unless the latter are too thick, go through the grinding machine together. It is left to the natives' discretion, and, though often queried by me, I note they for some reason prefer a certain amount of ash to go through the machine. Whether this latter holds good amongst all tribes, I do not profess to know nor care to think it is so. The grain is more often cleaned for my own satisfaction's sake to know they get good wholesome food.

Remember, the finer the ashes the better, and thoroughly mix, and although a very excellent method of treating all grains liable to weevil, it is not recommended for other than home consumption, as it might spoil the sale of mealies.

Yours faithfully,

F. Chambers.

[Note.—We may mention that we have information from a reliable source that the following cheap and simple device has been found effective in some cases as a defence against weevils when maize is stored in an ordinary open building. Building lime is spread thinly on the floor beneath the lowest layer of grain bags, and over every succeeding layer of bags a few handfuls of lime are sprinkled. It is claimed that grain so stored will not be attacked by weevils, and it would be interesting if other farmers would experiment with the idea and let us know the result for the benefit of all.—Ed., *R.A.J.*]

The Agricultural Outlook.

Little can be added to our last remarks under this head, for during the two months that have elapsed nothing of importance has happened to change the conditions or prospects of crops or stock generally. In Gwanda to the south and Mazoe to the north the late rains were sufficient to have a marked effect upon the veld, and in those districts good grazing seems to be assured for the winter. In other sections, however, we hear the grass is fast drying up, having suffered severely, first from lack of rain, and now from early frosts. In other parts, where pasturage is still fair, the streams are drying, and a shortage of water is anticipated. Little disease is reported amongst stock, and the danger most feared is poverty from lack of food. Late crops have also been affected by the early frost, but our remark in respect to late planting in this column last issue requires modification, for we find that in some districts the late planted crops of this peculiar season have done better than those sown at the normal time.

Veterinary Report.

March.

AFRICAN COAST FEVER.

Salisbury District.—No fresh outbreaks. On the Sternblick infected centres two infected animals were destroyed.

Mazoe District.—No fresh cases.

Melsetter District.—Fresh outbreaks occurred on the farms Wolverhampton and Helvetia, two animals infected at the former and one at the latter. The following mortality occurred:—Roslyn, 12; Joppa, 1; Inhoek, 5; Ravenswood, 3; Ostend, 1; Lombard's Rust, 2; Woodstock, 1; Diepfontein, 1; total, 28 head.

LIVER DISEASE IN CALVES.

A number of cases of liver disease in calves occurred in the Insiza district.

MALLEIN TEST.

The following animals were tested with mallein on importation, with negative results:—Horses, 10; donkeys, 11.

IMPORTATIONS.

In addition to the above, the following were imported from the Union:—Heifers, 126; bulls, 19; sheep and goats, 2,082.

EXPORTATIONS.

The following were exported to the Johannesburg abattoirs:—February, 84 head slaughter cattle; March, 405 head slaughter cattle.

April.

AFRICAN COAST FEVER.

Salisbury and Mazoe Districts.—No fresh outbreaks and no cases of disease at any of the infected centres.

Melsetter District.—Fresh outbreaks occurred on the farms Johannes Rust and Thabanchu; one animal in each herd infected. At the other infected centres the following mortality occurred:—Inhoek, 1; Wolvedraai, 2; Ostend, 2; Rockwood, 1; Lombard's Rust, 19; Mosgwe, 2; Diepfontein, 1; total, 30 head.

TUBERCULOSIS.

An ox forwarded from Bulawayo to the Johannesburg abattoirs was, on inspection after slaughter, found to be affected with tuberculosis.

TRYPANOSOMIASIS.

Blood smears from some donkeys working at the Copper Queen Mine, at the junction of the Umfuli and Umniati Rivers, Hartley district, shewed trypanosomes of the type *Try. Brucei v. Rhodesiense*. All the donkeys concerned were destroyed.

Preparations were received from cattle at Sikombela farm, Gwelo district; some of these from animals which had never been off the farm shewed trypanosomes, giving rise to the suspicion that these cattle may have been infected by

vectors other than the tsetse fly from animals which had been exposed in a fly belt and developed the disease after returning to the farm. As far as is known there is no tsetse fly within 40 miles of Sikombela.

MALLEIN TEST.

The following animals were tested with mallein on importation, with negative results:—Horses, 4; mules, 4; donkeys, 31.

TUBERCULIN TEST.

The following animals *ex* United Kingdom were tested with tuberculin, with negative results:—Bulls, 21; heifers, 18.

IMPORTATIONS.

In addition to the above, the following were imported:—Bulls, 18; heifers, 69; sheep and goats, 1,446; pigs, 10.

EXPORTATIONS.

During the month 1,261 head of slaughter cattle were forwarded to the Johannesburg abattoirs.

J. M. SINCLAIR,
Chief Veterinary Surgeon.

Farming Calendar.

June.

BEE-KEEPING.

At this season hives require to be painted; the woodwork, being exceedingly dry, is in good condition to receive it. Linseed oil (unboiled) is the best kind to mix with white lead, as it is more penetrating, acting as a better preservative than boiled oil. Bees will be able to take beneficial flights during warm days, so that dysentery need not be anticipated.

CITRUS FRUITS.

Cultivation of the grove is to be continued and pruning taken in hand towards the end of the month. Washington Navel oranges and some earlier varieties will be ready this month for gathering, packing and despatch.

CROPS.

The harvesting of the smaller crops will now be over, except possibly pea-nuts, mangels and dhal. Pea-nuts should be lifted before the first frosts if possible. Mangels may safely be allowed to remain in the ground until required for use; or, if harvested, should not be heaped, but spread thinly on the ground at a convenient spot. Dhal will not be ripe until the end of the month, when the plants should be cut about a foot above the ground, allowed to dry for a few days, then shaken to free the seeds from the pods. Ploughing should be continued through the month if possible, and, if the maize is cut and stooked on the side of the lands, the maize fields should be ploughed to keep down such pests as the stalk borer. Winter crops of wheat, oats and barley will not require much attention. As a rule, where water is plentiful, too much irrigation is practised. One application per month will generally be found sufficient for the above crops.

DECIDUOUS FRUITS.

Pruning of deciduous trees should be done this month or in July.

ENTOMOLOGICAL.

Cabbage Family.—Plants of this family suffer from cabbage louse and Bagrada bug during June.

Onions.—Suffer from thrip. The transplants may be dipped as far as the roots in tobacco wash or paraffin emulsion to keep down the pest.

Fig.—The winter crop of fruit is liable to suffer from fig weevil. The infested fruit should be collected and destroyed. If this has been done regularly with the first crop, the second crop is not likely to suffer much.

FLOWER GARDEN.

Annuals for early spring flowering should be sown, preferably in boxes in a warm place sheltered from the wind. Perennials, shrubs and ornamental

tree seeds may also be sown. Fruit trees, shrubs and roses should be pruned and all dead wood removed. Sweet peas require constant attention.

FORESTRY.

Burn out the grass in any fire traps round or near the plantation that were left unploughed. Any timber that is to be felled should be taken in hand this month.

GENERAL.

Grazing in drier districts is beginning to give out, and steps should now be taken to ensure that some good veld in the neighbourhood of the water is preserved for future use. It is a mistake, frequently seen, for all the grazing nearest to the drinking places to be first consumed, so that later on the cattle, when least able to endure fatigue and when the grass is in any case most scanty and dry, have furthest to walk from the feeding ground to water. A little forethought can obviate this trouble. Live stock are usually in good condition at this time of year and able to travel longer distances to water than may be the case later on in the season. Fire guards to prevent grass fires should be looked to.

POULTRY.

Early hatching should start this month. Stock birds should have been mated up at least ten days or a fortnight before the eggs are used for sitting. See that the male birds in the breeding pens are getting their full share of food. The brooders must be thoroughly cleaned and sprayed before the chicks are placed therein. Give your first feed to the chicks as early as possible each day and the last one immediately before they retire to rest. Their food, also that of poults, should be given little and often.

STOCK.

Cattle.—There is every indication of a good winter season for horned stock, and ranching cattle should not give much trouble. Dipping is best postponed during very cold snaps until a warm day occurs. Cows with autumn calves should be kept in the more sheltered paddocks. A watchful eye should be kept on all watering places in order to prevent their being fouled or stopped up. Bulls should be kept out of the herd until the end of July at least, and, in the meantime, they should be well fed and cared for in order to fit them for their work. The three watchwords in the dairy herd should be feed, shelter and bedding from now onwards. Ensilage will now be found invaluable, as also will pumpkins, majordas or any other form of succulent food. Good hay should be used to rack up with at night, and the maize ration should be supplemented with ground-nuts, ground-nut cake or bean meal. Young calves are better in the pens on very cold mornings until the sun has gained some power, when they may run on short sweet veld for a few hours. The above remarks with regard to dipping and water supply apply equally to dairy as to ranching herds.

Sheep.—As most vleis are still very wet, sheep are best kept on the high veld for a while longer. If grass seeds are troublesome, a grazing area should be mown. If the rams were put into the flock in May, they should now be removed. Ewes with lambs will benefit by a few handfuls of mealies, and perhaps ensilage. They should be provided with shelter from cold winds.

TOBACCO.

If the stubble of the old crop has not been taken out and burnt, it should be done now.

VEGETABLE GARDEN.

All the available space in the garden should now be thoroughly trenched and manured, the soil being well worked and loosened. Vegetables planted out for winter crops should be well and continuously cultivated, which will help to bring them along quicker and with less watering. Late-bearing tomatoes should be sheltered from the cold winds by a grass shield. Beans should be staked and tied. Beet, radish, carrot, parsnip, turnip, onion, leek, mustard, cress and tomatoes may be planted.

VETERINARY.

Horse-sickness should be practically over now. Redwater and gall-sickness occur all the year round, but the worst time is the summer, when ticks are prevalent. Blue tongue should be very little in evidence now. After twelve months in this Territory, sheep do not contract the disease. Inoculation can be carried out now. Scab is a poverty winter disease.

WEATHER.

Casual rains may occur, but except on the eastern frontier, none is to be reckoned upon, nor can it be regarded as seasonable or desirable. Frosts generally occur on a few nights during the month of June, and precautions must therefore be taken. This month and the next are the coldest of the year, and when the cold is accompanied by dull weather or "Scotch mist," known locally as "guti," it is apt to have a severe effect on live stock, especially if grazing should at the same time be scarce and water supplies far to travel to.

July.

BEE-KEEPING.

The warmer bees are kept during this month so much the stronger will they come out in the spring. Provide a thickness of 3 inches of cloth coverings over the frames, and where quilts are, on examination, found to be damp, replace them with dry ones. This is a favourable season to carry out repairs to hives. All section and shallow frame combs must be carefully stored away from ants and mice, as these will be wanted for the excellent honey to be stored in them next October, collected from the bush bloom.

CITRUS FRUITS.

Orange trees should be pruned this month, if this work is not completed. Groves must be well cultivated, especially after irrigation has taken place, and the soil round the trees hoed or dug over. Washington Navels will be gathered and some later varieties will be ready for picking. The irrigation of orange trees should be taken in hand when the trees are ready to commence the next growth.

CROPS.

See June.

DECIDUOUS TREES.

Pruning may be done this month.

ENTOMOLOGICAL.

Onions.—Thrip is liable to affect this crop, and when present calls for careful attention. Tobacco wash or paraffin emulsion should be used.

Deciduous Fruits.—Scale infested trees may receive a winter wash during this month. Lime sulphur salt wash or scalecide is recommended for this purpose.

Guava.—Citrus growers should always bear in mind that this fruit harbours citrus codling when there is no citrus fruit available. All guava trees, therefore, in the vicinity of citrus orchards should be stripped during this or next month, and the fruit buried deeply or burnt.

Fig.—Fig weevil may still be in evidence. The fruit is also sometimes attacked by citrus codling and other moths. The destruction of infested fruit is the most practical remedy for the pests.

FLOWER GARDEN.

Seeds of most annuals, perennials, shrubs and ornamental trees may be sown. Pruning, if not already done, should be attended to early. Dahlias and other summer-flowering bulbs should be taken up and stored for division and replanting whilst the soil is being prepared. Sweet peas require attention and staking.

FORESTRY.

Cuttings of all ornamental shrubs, roses, etc., should be taken now before the spring growth starts. Plants grown in tins during the previous season should be re-potted as soon as the cold weather is over.

GENERAL.

Veld fires are now liable to occur, and must be watched for and arrangements made to combat them. The loss that may result and the penalties under the Herbage Preservation Ordinance are to be borne in mind. Fire guards should this month be burnt round all grazing which it is desired to preserve for use later on.

POULTRY.

See that your brooder-reared chicks are warm enough during the cold nights, but do not overcrowd, and have the brooders well ventilated. Give your chicks as much run as possible when they are able to leave the brooder. There is little fear of rain now, and they will be healthier and develop better with a large shaded run. Do not let the mother hen and her brood sleep on the bare ground; they will probably be attacked by sand fleas.

STOCK.

Cattle.—On ranches the advice given for June applies still. The bulls may again be put into the herd at the end of the month. If grazing has been reserved for the winter months, it will probably be wise to turn the cattle into it now. Watch for any unthrifty cattle, and get them into the home paddock and feed them before they become really poor. Dairy cattle will require heavy feeding now, and if plenty of roughage is available, cows in milk will do better if kept in for a while on cold mornings and turned out only after the warmth of the sun is felt.

Sheep.—Vleis should now be fairly dry and may be utilised; otherwise the advice given for June applies.

VEGETABLE GARDEN.

Sow turnips, beans, peas, onions, cabbages, beet, carrots, parsnips, radishes, lettuce and spinach.

VETERINARY.

Horsesickness and blue tongue should now have disappeared. Redwater and gallsickness occur all the year round, but the worst time is during the summer, when ticks are prevalent. Sheep may be inoculated against blue tongue now. Scab in sheep will probably be in evidence this month.

WEATHER.

Though rains have fallen during every month of the year in Rhodesia, none are looked for or desired this month. Most stations record an average of .01 to .3 inch over a number of years. Severe cold is likely to occur at this time of year, the lowest temperatures occurring an hour or two before sunrise. Frosts may be looked for, especially on calm clear nights. Cold windy days and damp "guti" weather tell severely on cattle, if shelter and food are not provided.

PHASES OF THE MOON.

June :

8th	First Quarter
15th	Full Moon
22nd	Last Quarter
30th	New Moon

July :

8th	First Quarter
15th	Full Moon
21st	Last Quarter
30th	New Moon

August :

6th	First Quarter
13th	Full Moon
20th	Last Quarter
28th	New Moon

Weather Bureau.

TEMPERATURES.

Station	March		April	
	Mean Max.	Mean Min.	Mean Max.	Mean Min.
Mashonaland—				
Charter—				
Enkeldoorn	81·67	57·1	79·2	51·7
Hartley—				
Gatooma	89·7	60·1	87·3	58·0
Hallingbury Farm	85·8	59·2	82·9	51·6
Hartley Hospital	88·69	58·9	86·7	52·4
Idaho	85·8	57·53	—	—
Lomagundi—				
Eldorado Mine	82·53	60·66	82·0	53·4
Kanyemba	98·4	68·9	95·5	68·8
Sinoia	89·4	63·8	86·2	56·7
Sipolilo	84·3	61·2	82·8	55·3
Makoni—				
York Farm	—	—	78·0	55·2
Mangwendi—				
Kwenda Hospital	78·0	63·7	75·0	60·2
Mazoe—				
Shamva Mine	85·42	64·31	84·34	55·89
Melsetter—				
Melsetter	69·7	60·6	71·76	50·6
Mount Selinda	76·09	60·3	74·05	54·7
Vermont	79·3	60·47	77·55	57·1
Salisbury—				
Chishawasha	80·63	57·95	78·9	51·8
Salisbury (Gaol)	82·9	58·5	81·1	53·5
Umtali—				
Chiconga's Location ...	82·9	61·9	79·1	55·0
Public School	81·9	61·7	—	—
Summerfield	—	—	—	—
Victoria—				
Eythorne	84·5	57·2	78·1	50·1
Morgenster	78·7	60·5	75·5	57·6
Victoria	81·51	59·51	78·46	52·66
Matabeleland—				
Bulalima—				
Plumtree School	84·4	59·9	79·2	55·6
Tegwani	—	—	—	—
Bulawayo—				
Essexvale	83·67	59·35	80·7	51·06
Holly's Hope	85·4	61·5	81·9	52·2
Hope Fountain	81·9	57·5	—	—
Observatory	81·0	59·3		
Rhodes Matopo Park ...	89·5	61·9	83·4	55·1
Gwanda—				
Antelope Mine	85·22	63·35	82·2	58·4

TEMPERATURES—*(Continued).*

Station	March		April	
	Mean Max.	Mean Min.	Mean Max.	Mean Min.
MATABELELAND—(Continued)				
Gwelo—				
Gwelo (Gaol)	83·8	52·8	80·7	46·6
Hagley (Iron Mine Hill) ...	79·5	56·01	—	—
Mangwe—				
Empandeni	87·2	60·06	80·8	51·2
Garth	84·6	59·3	79·5	52·2
Tuli—				
Mazunga	91·0	64·8	87·2	56·8
Tuli	91·0	66·7	87·4	57·7
Wankie—				
Victoria Falls	91·0	54·8	88·7	47·8
Wankie (Hospital)	97·2	69·6	94·9	64·4

RAINFALL.

Station	March	April
MASHONALAND :		
Charter—		
Buhera	3·28	0·06
Bushy Park	3·23	—
Central Estates	1·33	—
Driefontein	1·34	0·53
Enkeldoorn	3·07	0·19
Grootfontein	0·72	—
Induna Farm	2·15	0·03
Marshbrook	2·79	0·30
Range	3·03	0·35
Riversdale	1·71	Nil
Spitzkop	1·85	—
Umniati	4·05	—
Umvuma (Railway)	2·25	0·81
Vrede	5·65	—
Wylde Grove	0·86	0·09
Chilimanzi—		
Orton's Drift	—	—
Hartley—		
Ardgowan	3·58	1·57
Auchter Leny	2·02	—
Battlefields (Railway)	1·27	Nil
Carnock Farm	3·86	2·12
Clifton Farm	1·11	1·37
Elephant Hill, Battlefields	1·17	—
Elvington	3·53	1·45
Gadzema (Railway)	1·65	0·40
Gatooma	1·57	0·33
Gatooma (Railway)	1·56	0·27
Gowerlands	2·47	0·51
Hallingbury	1·15	1·14

RAINFALL—*(Continued).*

Station	March	April
MASHONALAND—(Continued)		
Hartley—continued		
Hartley Hospital	2·27	0·49
Hartley (Railway)	1·39	0·30
Hopewell	..	0·43
Idaho	3·54	
"Jenkinstown"	3·11	0·94
Makwiro	1·96	0·18
Makwiro (Railway)	2·17	Nil
M'pofha Farm		
Philiphaugh	2·33	1·43
Shagari	1·00	
"Stoneygate"	3·88	0·66
Lomagundi—		
Argyle	2·41	1·84
Banket Junction (Railway)	3·37	2·30
Darwendale	1·00	2·45
Duxbury Farm	2·13	2·64
Eldorado (Railway)	3·67	1·92
Eldorado Mine	3·81	1·58
Golden Kopje Mine	1·94	
Kanyemba	3·34	Nil
Lion's Den		
Lone Cow Estate	2·42	4·05
Longmead	1·61	3·04
Palm Tree Farm	1·35	2·41
Sinoia	2·25	1·23
Sipolilo	2·76	1·09
Umvukwe Ranche		
Makoni—		
Chimbi Source	5·08	1·86
Eagle's Nest	4·82	0·29
Ellavale	1·20	0·77
Farm Carlow	2·45	
Gorubi Springs	3·56	1·51
Inyanga	5·60	0·55
Mona	5·16	—
Monte Cassino Mission	3·19	0·78
Odzi (Railway)	3·51	0·49
Rusape (Railway)	4·13	0·27
Springs	5·03	0·97
St. Trias' Hill	7·04	1·45
York Farm		0·23
Mangwendi—		
Bonongwe	1·52	0·63
Glen Somerset	3·55	0·20
Huish Estate	1·30	1·29
Kwenda Hospital	1·69	0·15
Land Settlement Farm	2·58	
Macheke (Railway)	2·68	0·72
Marandellas		
Marandellas (Railway)	3·91	0·76
Mtoko	3·03	0·70
Mrewa	5·94	0·99
Nelson	3·46	1·09
Selous Nek	2·59	0·36

RAINFALL—(*Continued*).

Station	March	April
MASHONALAND—(Continued)		
Mangwendi (continued)—		
Theydon	3·73	1·77
Tweedjan	1·75	0·63
Verdoy	2·50	1·41
Mazoe—		
Avonduur	3·91	1·37
Bindura	3·98	0·90
Bindura (Railway)	3·96	1·31
Ceres	4·64	0·58
Chipoli	5·24	0·02
Citrus Estate	3·93	—
Dunmaglas	4·43	—
Jumbo (Railway)	5·06	4·20
Kilmuir	4·33	2·17
Laguaha	3·38	0·12
Lowdale	—	—
Mazoe	4·02	2·90
Mguta Valley	4·13	1·25
Mount Darwin	3·50	0·01
Omeath	2·70	—
Ruia	6·59	—
Ruoko Ranche	4·12	3·18
Shamva	5·18	—
,, Mine	4·39	1·00
Stanley Kop	5·12	5·59
Sunnyside	3·90	2·48
Teign	4·16	2·98
Volynia Ranche	4·20	3·30
Melsetter—		
Brackenburg	6·43	—
Chikore	4·78	0·77
Chipinga	4·04	0·78
Helvetia	5·55	0·78
Melsetter	3·35	0·33
Mount Selinda	8·28	—
Mutambara Mission	2·77	0·03
Pasture	1·80	0·49
Tom's Hope	5·94	0·89
Vermont	8·55	1·18
Salisbury—		
Ardbennie	4·08	1·17
Avondale	3·18	1·40
Botanical Experiment Station	3·51	—
Bromley	2·57	1·40
Brookmead ...		
Borrowdale	6·09	—
Chishawasha	7·18	2·03
Cleveland Reservoir	3·59	2·28
Forest Nursery	4·34	—
Glenara	—	—
Goromonzi	6·60	2·84
Gwebi	3·59	1·56
Hillside	2·39	1·58
Lilfordia	2·04	

RAINFALL *(Continued).*

Station	March	April
MASHONALAND—(Continued)		
Salisbury—continued		
Salisbury (Gaol)	3·70	1·27
,, (Railway)	3·69	-
Sebastopol	5·62	1·49
Selby	4·13	—
Stapleford	—	—
The Meadows	—	—
Vamona	4·40	1·02
Westridge	2·94	2·20
Umtali—		
Chiconga's Location	3·53	0·64
Odzani	5·31	0·30
Penhalonga	—	—
Premier Estate	4·60	0·96
Public School	4·50	—
Sarum	5·58	1·39
Stralsrund	4·59	0·40
Summerfield	—	—
Umtali (Railway)	4·38	0·30
Utopia	—	—
Urungwe—		
Nassau Estate	1·71	1·25
Victoria—		
Bikita	8·45	0·71
Brucehame	2·77	0·07
Chibi	3·74	0·82
Chilimanzi	2·26	—
Chingombe	5·32	Nil
Chiredzi Ranche, Ndanga	3·76	,,
Clipsham	3·95	,,
Eagle's Nest Ranche	3·30	—
Empress Mine	4·76	—
Eythorne	4·91	0·03
Fairburn	1·93	0·06
Fort Victoria (Railway)	2·42	0·11
Gokomere	3·29	0·10
Gutu	5·83	0·02
Makorsi River Ranche	2·31	0·50
Marah Ranche	5·41	—
Marthadale	6·79	Nil
Morgenster	6·27	0·26
Ndanga	5·61	0·18
Pamushana	3·69	0·14
Silver Oaks	2·46	0·06
Tokwe River Ranche...	3·67	0·51
Victoria	2·44	0·07
MATABELELAND :		
Belingwe—		
Albany	2·92	0·64
Anglo-French Block	—	—
Filabusi	4·84	0·89
Fort Rixon	6·05	1·64

RAINFALL *(Continued).*

Station	March	April
MATABELELAND—(Continued)		
Belingwe—continued		
Infiningwe	4·20	—
Insiza (Railway)	5·04	0·20
Orangevale	5·01	0·72
Roodeheuvel	2·87	1·14
Scaleby	3·23	0·43
Shangani Estates	4·17	—
Shangani (Railway)	2·81	Nil
Tamba	2·68	—
Thornville	3·53	0·50
Wedza	3·68	0·79
Bubi—		
Inyati	2·72	0·47
Leighton Farm	—	—
Lochard Experiment Farm	3·90	1·40
Bulalima—		
Mholi (late Magot)	5·10	0·23
Plumtree School	2·81	0·30
Riverbank Farm	3·37	0·64
Solusi Mission	4·12	1·08
Syringa	2·86	0·43
The Retreat	—	—
Tjompanie	4·21	0·36
Bulawayo—		
Balla Balla (Railway)	7·53	0·92
Bembesi (Railway)	2·98	1·32
Crombie's	3·38	1·53
Edwaleni	2·51	—
Essexvale	2·58	1·28
Government House	—	—
Gwaai (Railway)	1·14	2·45
Heany Junction (Railway)	2·03	1·85
Holly's Hope	3·66	1·07
Hope Fountain	3·82	—
Imbesu Kraal	4·98	1·76
Impondemi	3·42	1·79
Keendale	5·53	1·58
Khami	4·08	
Lower Rangemore	2·70	—
Matopo Mission	2·87	1·44
Maxim Hill	3·30	1·72
Melinakanda Junction	2·39	
Naseby	6·55	0·74
Nyamandhlovu (Railway)	3·53	1·90
Observatory	5·87	
Raylton (Railway)	4·06	1·74
Rhodes Matopo Park	3·02	1·80
Springs	2·21	1·64
Umkien	—	
Umgusa	2·47	—

RAINFALL *(Continued)*

Station	March	April
MATABELELAND—(Continued)		
Gwanda—		
Antelope Mine	6·67	0·41
Gwanda (Railway)	2·24	1·11
,, (Gaol)	2·48	1·18
Mtshabzi Mission	3·87	1·31
West Nicholson (Railway)	3·80	0·71
Gwelo—		
Daisyfield	2·42	0·06
Dawn	0·75	—
Gwelo (Gaol)	1·09	0·14
Gwelo (Railway)	0·87	0·10
Globe and Phœnix (Railway)	2·80	0·04
Hagley	5·19	—
Indiva Farm	—	—
Lalapanzi (Railway)	4·54	0·38
Lovers' Walk	0·88	0·03
Lower Gwelo	1·42	1·03
Oaklands	2·21	0·83
Que Que	2·59	0·04
Rhodesdale Estate	3·55	—
Selukwe (Railway)	4·31	0·52
Sikombela Farm	1·77	0·38
Troy	—	
Woodendhove	3·00	—
Mafungabusi—		
Gokwe	2·18	—
Inyoka	1·67	0·74
Mangwe—		
Empandeni	3·03	1·02
Garth	5·38	1·23
Tuli—		
Lamulas	5·90	0·21
Langalanga	1·79	0·52
Makalali	3·23	0·44
Manantji	2·01	0·49
Mapande	2·10	0·66
Mazunga	2·45	0·63
Tuli	2·34	0·46
Wankie—		
Bombusi	3·82	0·05
Malindi (Railway)	1·34	1·69
Victoria Falls	1·48	0·49
Victoria Falls (Railway)	1·75	0·69
Wankie Hospital	1·15	Nil
Wankie (Railway)	1·33	0·16

No return.

Dates of Meetings of Farmers' Associations, Southern Rhodesia

(SUBJECT TO ALTERATION)

Name of Association	Place of Meeting	Secretary	1916		
			June	July	August
Beatrice Road	Various farmhouses	H. W. Harris	14	12	9
Bembesi	Queen's Mine Hotel	V. C. Andrews	2	7	4
Bindura	Bindura	A. C. Mills	10	8	12
Bromley	Bromley	A. A. Draper	..	..	..
Charter—Mgezi	Beatrice Mine	W. Krienke	28	26	30
Central	Umvuma	B. M. Yorke	24	29	26
Eastern Border (South Melsetter)	Various farmhouses	J. W. Scott	7	5	2
Enterprise	Arcturus Hotel	J. Watson	7	5	2
Felixburg	Felixburg	R. H. Brown	24	29	26
Figtree Branch, R.L. and F.A.	Figtree Hotel	W. H. Robertson	3	..	5
Gatooma	Gatooma	T. J. Golding	17	15	19
Gazaland	Chipinga	W. Wood	24	29	26
Greystone	Roodeheuvel Farm, Shangani	J. W. Spencer	10	8	12
Hartley	Hartley	J. de L. Nimmo	10	15	12
Headlands	Headlands	J. M. Harvard	24	..	26
Hunter's Road Farmers and Stockowners	Hunter's Road Siding	R. H. Twilley	10	8	12
Insiza—Shangani	Shangani	T. E. Penny	3	..	..
Iron Mine Hill Proper	Iron Mine Hill	T. Irving	10	8	12
Lalapanzi and Iron Mine Hill	Lalapanzi and Iron Mine Hill	Cyril Allen	10	8	12
Lomagundi	Sinoia	S. R. Garrard	17	15	19
Macheke	Macheke	W. J. K. Webster		No fixed dates	
Makwiro	Makwiro	T. R. McLellan	16	21	18
Marandellas and Mangwendi	Marandellas Farmers' Hall	A. Nicholson	2	1	5
Makoni	Rusape	H. Barnes Pope	3	1	5
Marula	Marula Siding	Mac. W. Ingram	24	22	26
Mashonaland	Commercial Hotel, Salisbury	J. Reid Rowland	7	5	2
Matopo Branch, R.L. and F.A.	Sibali	W. Bathurst	..	12	..
Mazoe	Glendale Siding	T. Mossop	..	19	..
Melsetter (North)	Various farms	Rev. R. Wodehouse	3	..	..
Midlands	Gwelo	P.O. Box 23, Gwelo	16	8	12
Northern Umtali	Farm "Summerfield"	R. O. H. Blurton	..	..	5
Norton and District	Norton Siding	T. A. Osler	3	1	5
Que Que	Que Que	E. J. Ross	17	15	19
Rhodesian Landowners and Farmers	Library Buildings, Bulawayo	H. S. Hopkins	30	28	25
Shamva	Shamva	J. M. Moubray	..	19	..
Selukwe	Selukwe	F. S. Clark		No fixed dates	
Somabula and Shangani Flats	Weltevrede School	G. B. Botha		8	..
Umvukwe	Various ranches	H. K. Bracewell		No fixed dates	
Umtali	Christmas Pass Hotel	J. S. Holland	3	1	5
Victoria	Victoria	H. S. Hoatson	21	19	16
Vungu	Vungu	J. H. Erasmus	..	..	..
Western	Plumtree Hotel	A. Barclay	10	8	12

Departmental Notices.

Information for Farmers

The Department of Agriculture is prepared to furnish to farmers technical advice either by correspondence, or, where possible, by personal visits. All communications should be addressed in the first instance to the Director of Agriculture.

Crops

The Agricultural Branch deals with enquiries relating to agricultural practice, soils, crops, cultural operations, processes, seeds, trees, farm implements and machinery, etc.

Disposal of Pure Seed.

Farmers devoting special attention to the production of pure seed of any locally grown crops are invited to communicate with the Government Agriculturist, and at the same time to submit a $\frac{1}{4}$ lb. sample of any seed which they may have for disposal.

In addition to indicating the total amount of seed offered and the price f.o.r. the nearest railway station or siding, the correct name of the variety and the origin of the seed from which the crop was grown should be given. In the case of special attention having been devoted to seed selection, the methods employed should be described.

Where these stipulations are complied with, and the samples forwarded are deemed by the Agriculturist of sufficiently high quality for seed purposes, growers and intending purchasers will be put in touch with one another. It is hoped by this means to encourage the production of pure seed, and growers are urged whenever possible to sell their seed under guarantee of trueness to name, type and sample deposited with the Department.

After placing growers and would-be purchasers in touch with one another, the Department can accept no further responsibility except in the position of adjudicator when bulk supplies are thought inferior to sample and description, in

which case both parties will be required to abide by the decision of the Department.

For further particulars see article on Pure Seed Supply, *Rhodesia Agricultural Journal*, February, 1914.

Poisonous Plants

It is of great importance that as soon as possible a study should be made of those plants found in Southern Rhodesia which are poisonous or deleterious to small or large stock. Farmers and others who have known, or suspected poisonous plants on their property, are requested to communicate with the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, at the same time forwarding specimens of the plant, including stem, leaves, flowers, and, where possible, fruit. Any particular regarding the habits of the plant will be welcomed, and in return the Department will supply all available information regarding the plants.

Live Stock

The Animal Industry Branch is prepared to advise with regard to all matters connected with stock breeding, selection, feeding and registration of stud animals, the dairy industry, poultry management, farm buildings for stock, and kindred subjects. Buyers and sellers of stud stock in Rhodesia are also put in touch with one another.

Entomology

The Government Entomologist advises on matters connected with insect pests of live stock, crops, and fruit trees, and also undertakes the inspection of nurseries and of the importation of plants from abroad.

Chemical Analyses

The Government Agricultural Chemist deals with matters relating to the composition of soils, fertilisers, farm produce of vegetable or animal origin; also the investigation of poisons and of articles of potential economic value.

Nominal charges are made, which, while not covering the cost, will help to defray the expense and serve as a proof of good faith. Samples, carriage prepaid, together with full particulars regarding the subject should be addressed to the Agricultural Chemist, Department of Agriculture, Salisbury.

A schedule of charges and directions for taking samples will be furnished on application.

With all analyses, reports will be furnished explanatory of the results and, when possible, advice given as to the nature, properties and value of the material.

No charge will be made for analysis where the material forwarded is considered by the Director of Agriculture and Chemist to be of sufficient general interest.

Citrus Culture

The Government Citrus Adviser advises on all matters connected with the citrus and deciduous fruit industry.

Services of Government Veterinary Surgeons

1. The services of Government Veterinary Surgeons are available to the public, free of charge, for the following purposes only :—

(1) Attending and giving professional advice in connection with the following diseases, viz. :—Anthrax, Contagious abortion, East Coast Fever, Epizootic Lymphangitis, Foot and Mouth Disease, Farcy, Foot-rot, Heartwater, Glanders, Intestinal parasites amongst sheep and goats, Liver Disease, Lungsickness, Osteo Porosis, Malarial Catarrhal Fever (blue tongue), Rabies, Redwater, Rinderpest, Scabies, Sponziekte (quarter evil), Swine Fever, and any other diseases which may in future be scheduled in terms of section 3, sub-section 18 of the "Animals Diseases Consolidation Ordinance, 1906." Attending to cases of disease amongst live stock which, though not of a contagious or infectious character, may be of general public importance.

(2) Applying tests in regard to Glanders, Tuberculosis, or any other disease against the introduction or spread of which tests are applied under regulations.

(3) Inoculations against the following diseases :—

Horsesickness, Lungsickness, Anthrax, Quarter Evil, Redwater, Malarial Catarrhal Fever (blue tongue). A fee to cover the cost of serum and virus will be charged.

2. The following charges shall be made and payable for services rendered by the Government Veterinary Surgeons in other cases, viz. :—

	£	s.	d.
(1) For every professional visit within three miles of his office or residence	0	5	0
(2) For every professional visit beyond such distance	0	10	6
plus an additional charge of 2/6 per hour whilst engaged in such visits or £2/2/0 a day of 24 hours;			
(3) For advice given at the Veterinary Surgeon's office, for each animal, per visit	0	2	6
(4) The following to be charged in addition to visiting fees :—			
a. For every examination as to soundness, each	1	1	0
b. For castration, horses, each	1	1	0
c. For castration, bulls, each	0	5	0
d. For castration, donkeys, each.. ...	0	10	6
e. For parturition cases, mares, each	2	2	0
f. For parturition cases, cows, each..	1	1	0
g. For other operations, according to nature, from 5/- to £2/2/0.			

3. Double the above fees will be payable for services rendered on Sundays, public holidays, and between the hours of 7 p.m. and 7 a.m.

4. Applicants for the services of Government Veterinary Surgeons must at their own cost provide the necessary transport for the conveyance of these officers from, and back to, their residence or nearest railway station.

5. Farmers and owners of stock throughout the country frequently telegraph for a Government Veterinary Surgeon to be sent to attend an animal which has been taken seriously ill. It is rarely possible to comply with these requests at once, as the Veterinary Surgeon may be engaged on duty which he cannot leave, or is at such a distance from where his services are required that he can hardly be expected to arrive in time to be of any service in an urgent case. Hence much valuable time is wasted, the owner of the animal is dissatisfied, and the veterinary staff discredited. To obviate this, in all cases where veterinary advice and assistance are required, the owner should telegraph to "Veteran," Salisbury, with prepaid reply, the nature of the complaint that the animal is suffering from, giving as full and accurate a description of the symptoms as possible. This will enable the Chief Veterinary Surgeon to telegraph advice at once and state whether he is able to arrange for veterinary attendance on the case or not, and save valuable time, which is always of importance in acute cases.

6. The services of Government Veterinary Surgeons will only be available for private work with the consent of such officers, and when such work does not interfere with their official duties, or when the services of a private practitioner are not available.

7. As the arrangement of allowing Government Veterinary Surgeons to attend to private cases is intended purely for the benefit of farmers and stock-owners who may wish to obtain professional advice, no responsibility whatever will be accepted for any loss of stock, etc., which may result from the negligent treatment or advice, or wilful default, of any Government Veterinary Surgeon.

8. All fees collected in terms of these Regulations are payable to the Treasury through the local Receiver of Revenue.

Irrigation

From the Agricultural Engineer assistance may be obtained by farmers for the following :—

1. In the locating of possible irrigation projects.
2. In the preparation of surveys or plans and for irrigation works, including weirs, dams, furrows, pumping

plants, and determining the extent of land which may be brought under irrigation schemes, together with rough estimates of costs.

3. In the supervision of construction and carrying out of projects.
4. In the selection of suitable sites for boring operations.
5. Preparing specifications, etc., regarding pumping plants, windmills, and agricultural machinery.
6. Giving general advice on cognate subjects.

Informal advice of a general character will be given to applicants making enquiry by letter or in person. Any applicant desiring professional assistance likely to occupy more than one day should apply for advice in writing. All applicants should specify clearly the nature of the project on which they seek advice, and should give full particulars as to the distance and direction of their farms from some well-known centre. Applicants will be required to provide suitable means of transport for the officer concerned during the period devoted to work on the spot; to provide any unskilled labour that may be required; and to provide for any other contingent services. Applications should be addressed to the Director of Agriculture, who will endeavour to arrange visits as far as possible in order of application, but with due regard to situation, in order to obviate unnecessary travelling and delay. The services of the Agricultural Engineer are given free, but in cases demanding prolonged individual attention, or repeated supervision, a charge may be made according to circumstances.

Samples

In connection with enquiries, especially with regard to diseases amongst crops, insect pests, soils, grain and the identification of plants, specimens should, wherever possible, be sent, together with full details. It is found that such parcels are often forwarded without any indication of where they are from or why they were sent and it is difficult in such cases to trace the sender. It is, therefore, requested that persons when forwarding samples for examination, indicate clearly their names and address on the package, so as to enable their requirements to be attended to without delay.

The Analysis of Agricultural Products, Soils, Water, etc.

SCALE OF CHARGES.

Arrangements have now been made for the chemical examination of soils, grain, and other produce, oil-seeds, milk, water, fertilisers, etc., on behalf of farmers and others by the Chemist attached to the Department of Agriculture. The charges made, while not covering the cost, will help to defray the expense and serve as a proof of good faith. Samples, carriage prepaid, together with full particulars regarding the subject, should be addressed to the Agricultural Chemist, Department of Agriculture, Salisbury.

Schedule of Charges.

	£	s.	d.
1. Partial analysis of a manure or feeding stuff, for each constituent	0	5	0
2. Complete analysis and valuation of a manure or feeding stuff	1	0	0
3. Analysis of agricultural products, *e.g.*, grain, hay, roots, etc.	1	0	0
4. Analysis of water for agricultural purposes, irrigation or drainage	1	5	0
5. Partial analysis of soil to determine fertility and recommendations as to manurial treatment	2	0	0
6. Complete analysis of a soil	3	0	0
7. Milk—determination of total fat and solids ...	0	5	0
do. do. of fat only	0	2	6
do. complete analysis	0	10	0
8. Cream—determination of fat only	0	2	6
do. complete analysis	0	10	0
9. Analysis of cheese	0	10	0
10. Limestone—estimation of percentage of lime	0	5	0
do. complete analysis	1	0	0

Remittances should accompany samples submitted.

No charge will be made where the material forwarded is considered by the Director of Agriculture and Chemist to be of sufficient general interest.

Directions for Taking Samples of Soils.

It is recommended to select four or five spots at least, per acre, taking care that these represent as far as possible the general character of the soil of the field. If the soil of the area to be reported upon presents notable differences, the samples gathered from the different parts must be kept separate.

Having selected a proper spot, pull up the plants growing upon it and remove surface accumulations of decaying leaves, etc., if any. Dig a hole about twelve inches deep and trim one side so as to be smooth and vertical; from the side so prepared remove with the aid of a sharp spade a slice of uniform thickness—about three or four inches—down to a depth of nine inches. Place the slice on a clean board or cloth and mix thoroughly with similar slices obtained in the same way from other parts of the field area. About six pounds of the mixture are then placed in a clean cloth bag or wooden box. Forward with the sample the following particulars:—

Date of collection, exact location, position (hillside, vlei or flat), peculiarities of soil or sub-soil, behaviour in wet and dry seasons, crops borne, previous manurial treatment, and every circumstance in fact which will throw light on its agricultural qualities.

Directions for Taking Samples of Grains, Produce and Feeding Stuffs.

Grains, meal and feeding stuffs and all agricultural produce should be sampled in the same manner as prescribed for fertilisers.

When the feeding stuff is in the state of cake, select not less than three cakes where the quantity does not exceed one ton, not less than five cakes when the quantity does not exceed five tons, and not less than ten cakes when the quantity exceeds five tons.

Break the selected cakes into small pieces, mix them together, and take the sample—not less than one pound—from the mixture.

Directions for Taking Samples of Fertilisers.

If delivered in bags, select not less than two bags when the quantity does not exceed one ton, and one additional bag for every additional ton.

In no case need more than ten bags be selected.

Empty the selected bags separately on to a clean wooden or stone floor. Thoroughly mix the contents, and set aside one spadeful from each bag, mix together the separate spadefuls, and from the mixture take about one pound as a sample.

If the fertiliser is in bulk, mix together portions taken from the different parts, and draw the sample from the mixture.

Directions for Taking Samples of Water.

All samples should be sent in glass bottles. Stoneware jars are to be avoided. The bottles should preferably be provided with glass stoppers; if corks are used, they must be new and well washed previously in pure water.

In sampling a stream or tank, before taking the samples rinse out the bottle several times with water, taking care to avoid the introduction of mud or sediment.

Before taking a sample of water from a pipe, allow the water to run through it for a few minutes at full pressure.

In all cases, before the sample is taken, always rinse out the bottle several times with the water to be sampled.

Quantity to be taken: 1 gallon.

Directions for Taking Samples of Milk and Cream for Butter-Fat Determinations.

The bulk from which the sample is to be drawn should be first poured two or three times from one vessel to another, and about half-a-pint forwarded for examination.

If it is impossible to deliver the sample in a fresh condition, introduce into each sample bottle about as much of the following preservatives as can be held upon a threepenny piece:—Borax, boric acid or salicylic acid; stating which preservative has been used.

All bottles used must have been previously cleansed with boiling water.

Charges for Dipping Cattle at Government Dipping Tanks.

A charge of 1d. per head is made in respect of all cattle dipped at Government dipping tanks.

Unweaned calves will be dipped free of charge.

Payment may be made in cash or by means of books of coupons at £1, 10/- and 2/6, which can be obtained from Civil Commissioners, Native Commissioners, or through all Veterinary Surgeons and Cattle Inspectors.

The tanks to which these provisions at present apply are the following :—

Salisbury (3), Bulawayo (3), Inyati, Umtali, Penhalonga, Melsetter, Marandellas, Macheke, Mazoe, Lomagundi, Hartley, Gwelo, Selukwe, Enkeldoorn, Victoria, Gwanda, Gatooma, Que Que, Umvuma, Kimberley Reefs.

Lectures for Farmers

The services of certain of the officers of the Department of Agriculture and the Veterinary Department are available for purposes of delivering lectures on subjects upon which they have special knowledge. As far as practicable, lectures will be accompanied by demonstrations at the time or subsequently in the field. Owing to the many calls on the time of the staff and the exigencies of their duties, alternative dates are desirable in order to avoid disappointment. The following topics are offered as examples of subjects that may be dealt with in this manner, but the suggestion of other themes is invited.

Agriculture.—Maize growing; Maize selection and maintenance of the breeding plot; Points of maize and maize judging, with demonstrations; Utilisation of granite vlei soils; Ground nut culture; Rotation crops for home use and for sale; Veld improvement by winter grasses; Production of foodstuffs for the mines; Ensilage; Fungoid diseases of maize and wheat; Wheat, oats and lucerne under irrigation; The prospects of cotton culture in Southern Rhodesia.

Veterinary Hygiene.—Detection and prevention of disease; The care of live stock.

Live Stock.—Judging of cattle according to breeds, and for beef, milk and draught; feeding and kraaling of live stock; general principles of cattle breeding; management of imported stock; grading up of native or local stock with pure bred bulls.

Dairying.—Home butter-making; building and equipment of a farm dairy; handling and marketing of milk; packing and marketing of butter; construction of cow houses.

Swine Husbandry.—Breeding and feeding of swine; some suggestions for the production of first-class bacon pigs; construction of piggeries at moderate cost.

Chemistry.—The principles of soil fertility; the principles of manuring; the value of lime in agriculture; chemistry of milk and its products (accompanied by demonstrations in milk-testing).

Entomology.—Economic entomology on the farm; the role of insects and their allies in the transmission of disease; scale insects and fruit trees and methods for their control; insect pests and maize; enemies of the potato, insect and fungus; the value and objects of plant import and nursery regulations.

Irrigation.—Methods of applying water to land for irrigation; the measurement of water in connection with irrigation; canal irrigation; storage reservoirs; hints on the selection of sites and on the design of earthen and other dams; irrigation by pumping, with notes on the selection of plants.

Enquiries and invitations should in the first instance be addressed to the Director of Agriculture, Salisbury.

Departmental Bulletins.

The following Bulletins, consisting of reprints of articles which have appeared in this Journal, are available for distribution free of charge to applicants in Rhodesia :—

AGRICULTURE.

No. 61. Requirements in sending Botanical Specimens to the Department for Identification.

No. 62. Services of Agricultural Engineer.

No. 64. Hints on Irrigation—Small Gravitation Schemes, by W. M. Watt.

No. 81. Possibilities of Export Trade in Oil Seeds, by H. Godfrey Mundy, F.L.S.

No. 90. Reports on Experiments—Experimental Station, Salisbury, 1910-1911, by J. H. Hampton.

No. 94. Second Report on Experiments, by J. H. Hampton.

No. 125. Subterranean Water, by W. M. Watt.

No. 155. The Manuring of Maize on the Government Experimental Farm, Gwebi, 1912-13.

No. 160. Hints on Irrigation—Pumping Plants, by W. M. Watt, Agricultural Engineer.

No. 177. Notes on the Raising of Seedling Trees, by F. B. Willoughby.

No. 189. The Manuring of Maize on the Government Experiment Farm, Gwebi, by G. N. Blackshaw, B.Sc., F.C.S.

No. 192. A Calendar of Crop Sowings, by H. Godfrey Mundy, F.L.S.

No. 203. Ensilage, by J. A. T. Walters, B.A., and The Feeding of Ensilage to Dairy Cattle in Winter, by R. C. Simmons.

No. 206. Hints on Irrigation : Small Earthen Storage Reservoirs, by W. M. Watt.

No. 212. Citrus Fruits in Rhodesia, by A. G. Turner.

No. 216. Manuring of Maize on Government Experiment Farm, Gwebi, by A. G. Holborow, F.I.C.

No. 218. Useful Measurements of Maize, by J. A. T. Walters, B.A.

No. 220. Reports on Crop Experiments, Gwebi, 1914-15, by E. A. Nobbs, Ph.D., B.Sc.

No. 221. Results of Experiments, Longila, 1914-15, by J. Muirhead.

No. 222. Costs of Farm Operations, Gwebi.

No. 300. The Dangers and Prevention of Soil Erosion, by W. M. Watt.

Tree Culture in Southern Rhodesia, by P. B. S. Wrey, A.M.I.C.E.

CROPS.

No. 88. Chicory Growing, by H. Godfrey Mundy, F.L.S.

No. 106. Cultivation and Preparation of Ginger.

No. 126. Turkish Tobacco.

No. 132. Sumatra Tobacco, Hints to Rhodesian Growers, by C. J. Sketchley.

No. 138. **Tobacco Culture (Virginia)—Harvesting and Curing.**

No. 162. Rhodesian Maize: The Principal Types and their Points, by J. A. T. Walters, B.A., Assistant Agriculturist.

No. 170. Production of Pedigree Seed—Maize, by H. Godfrey Mundy, F.L.S.

No. 174. Notes on Hop Growing, by H. Godfrey Mundy, F.L.S.

No. 175. Notes on Lucerne, by H. Godfrey Mundy, F.L.S.

No. 176. The Cultivation of Castor Oil Beans, by H. Godfrey Mundy, F.L.S.

No. 179. Buckwheat, by H. G. Mundy, F.L.S.

No. 181. Sunflower Cultivation, by H. G. Mundy, F.L.S.

No. 188. The Ground-Nut or Monkey Nut, by H. Godfrey Mundy, F.L.S.

No. 193. Oats in Southern Rhodesia, by H. Godfrey Mundy, F.L.S.

No. 194. Rye, by J. A. T. Walters, B.A.

No. 201. Dhal or Pigeon-Pea, by J. A. T. Walters, B.A.

No. 207. Crop Rotation in Southern Rhodesia, by J. A. T. Walters, B.A.

No. 225. Napier Fodder or Elephant Grass, by J. A. T. Walters, B.A.

No. 232. Witch-Weed or Rooi-Bloem, by J. A. T. Walters, B.A.

ENTOMOLOGY AND VEGETABLE PATHOLOGY.

No. 43. Citrus Psylla.

No. 75. Fumigation of Fruit Trees with Hydrocyanic Acid Gas, by R. W. Jack, F.E.S.

No. 139. Termites, or "White Ants," by Rupert W. Jack, F.E.S.

No. 140. Insect Pests of Tobacco in Southern Rhodesia, by R. W. Jack, F.E.S.

No. 142. The Bean Stem Maggot, by R. W. Jack, F.E.S.

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No. 219. More Household Insects, by R. Lowe Thompson, B.A.
No. 228. Rhodesian Citrus Pests, by R. W. Jack, F.E.S.

VETERINARY.

No. 50. Epizootic Abortion in Cattle, by Ll. E. W. Bevan, M.R.C.V.S.
No. 51. Strangles, by F. D. Ferguson, M.R.C.V.S.
No. 53. Animals Diseases Consolidation Ordinance, 1904.
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No. 103. Dipping and Tick-Destroying Agents, by Lt.-Col. H. Watkins-Pitchford.
No. 121. Rabies, by Ll. E. W. Bevan, M.R.C.V.S., and T. G. Millington, M.R.C.V.S., D.V.H.
No. 165. Report of Veterinary Conference, Bulawayo, April, 1913.
No. 180. Note on the Treatment of Biliary Fever of the Horse with Trypan Blue, by Ll. E. W. Bevan, M.R.C.V.S.
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No. 223. A Note on Contagious Abortion, by Ll. E. W. Bevan, Government Veterinary Bacteriologist.

LIVE STOCK.

No. 96. Swine Breeds and Breeding of, by Loudon M. Douglas, F.R.S.E.
No. 101. Hints to Dairy Farmers, by J. C. Jesser Coope, F.C.S., N.D.D.
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MISCELLANEOUS.

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No. 168. Report on the Methods of Growing, Curing and Selling Bright Tobacco in Virginia, U.S.A., by H. Kay Scorror.

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No. 186. Concrete and Reinforced Concrete, by E. Hardcastle, M.I.E.E.

No. 196. Collection of Agricultural Statistics in Southern Rhodesia, by Eric A. Nobbs, Ph.D., B.Sc.

No. 198. Poultry Keeping for the Rhodesian Farmer, by Frank Sheppard.

No. 199. Eucalypts for the Farm, by J. J. Boocock.

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No. 209. The Agricultural Returns for 1914, by B. Haslewood, F.S.S.

No. 213. Hydraulic Rams, by W. Martin Watt.

No. 217. Windbreaks and Hedges, by F. B. Willoughby.

No. 224. Statistical Returns of Crops, 1914-15, by E. A. Nobbs, Ph.D., B.Sc., and B. Haslewood, F.S.S.

No. 226. Classification of Clouds.

No. 230. Farm and Live Stock Statistics, 1915, by Eric A. Nobbs, Ph.D., B.Sc., and B. Haslewood, F.S.S.

No. 231. Estimates of Maize and Tobacco Crops, 1915-16, by Eric A. Nobbs, Ph.D., B.Sc., and B. Haslewood, F.S.S.

Malarial Fever: How it is caused and how it may be prevented, by Sir Ronald Ross, F.R.C.S., D.Sc., LL.D., F.R.S., K.C.B., etc.

Malaria: its History, Prevention and Cure, by A. M. Fleming, C.M.G., M.B., F.R.C.S. (Ed.), D.P.H. (Camb.), Medical Director.

Game Law: Summary of.

Terms for Analysis by the Department of Agriculture, of Produce, Soils, Water, etc

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HANDBOOK OF TOBACCO CULTURE for Planters in Southern Rhodesia. Sold by the Department of Agriculture. 2/6.

Employment on Farms.

The Department of Agriculture receives numerous enquiries from persons of varied attainments, age and financial position for openings on farms, as managers, assistants and learners, requiring remuneration on corresponding scales, or willing to give services in return for keep.

In order that work may be found for the above and needs of farmers met, applications are invited from both employers and persons seeking employment. Applications are also invited from artisans, such as masons, bricklayers, carpenters, fencers, well sinkers, concrete workers, and the like who may desire work on farms. In cases where employers have obtained the labour they require, or applicants for employment have found work, it is requested that notification be at once sent to the Department of Agriculture, in order that unnecessary correspondence be avoided.

Replies to the following applications should be addressed to the initials of the advertisers, c/o Director of Agriculture, who will forward the letter to the party referred to.

Note.—The following advertisements will not be repeated unless the advertisers inform us they wish them to be continued:—

SITUATIONS VACANT.

R. D. G.—Vacancy for a reliable and companionable farm pupil.

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A. T. P.—As learner; strong, intelligent, willing; will work in any capacity.

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G. D. V.—Has a little capital and wishes to take over a stocked farm on lease or management; Rhodesian experience; good references.

Government Notices.

No. 50 of 1912.] [8th February, 1912.

(As amended by Nos. 329 and 383 of 1914.)

AFRICAN COAST FEVER.

Regulations regarding the movement of cattle and the prevention and suppression of disease.

1. UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw Government Notices Nos. 329 of 1910 and 308 of 1911 and make the following provisions in lieu thereof :—

2. The various districts of Southern Rhodesia are hereby declared an area infected with African Coast Fever for the purposes of section 5 (2) of the aforesaid Ordinance, and, save as hereinafter set out, all movement of cattle within the said districts is prohibited until further notice.

General Movement.

3. For the purpose of section 22 (1) of the said Ordinance, the following shall be regarded as places within the boundaries of which the movement of cattle may be allowed without special permission :—

(a) Single farm.

(b) An area occupied by an owner or lessee, under one management, comprising contiguous farms and situated within one cattle transport area. The mere possession by an owner or lessee of grazing rights over a contiguous farm or farms shall not constitute occupation of such farm or farms.

(c) An area the property of one owner.

(d) For grazing purposes, an area within a radius of four miles of native kraals situated on unalienated land or in reserves, save and in so far as such area includes any private land.

The sites of such kraals shall be deemed to be the places where they are situated at the date of promulgation of these regulations.

(e) An area under the management or control of any Municipality, Sanitary Board or Village Management Board.

4. Notwithstanding the provisions of the last preceding section, or of section 9 hereof, the Chief Inspector may, on the outbreak of disease, or for such other cause as may be deemed expedient, direct the isolation or quarantine of cattle on a limited area of the aforesaid places.

5. The movement of cattle from place to place may be permitted under the special permission, in writing, of an Inspector, Sub-Inspector, or other officer or person duly authorised by the Administrator to grant such permission.

6. No permission as aforesaid shall permit the movement of cattle—

(a) Without the written consent of the owners, occupiers or managers of occupied land, and in the case of native reserves, of the Native Commissioner of the district over which land or reserve such

cattle will pass, whether along roads or otherwise; provided, however, that refusal to grant such consent shall be in writing, and provided further that if the Controller of Stock or the Chief Inspector shall consider that such consent is withheld without good and sufficient cause he may permit of movement without such consent.

If any such person mentioned above refuse to give consent or to state a reason for refusing to do so in writing, no valid objection shall be deemed to exist and movement may be permitted without such written consent.

(b) Within a veterinary district as defined in the Schedule annexed hereto from one transport area to or through another without the consent of the Cattle Inspector in charge of such area.

(c) From any veterinary district to or through another without the consent of the District Veterinary Surgeon of such district.

Slaughter Cattle.

7. Cattle moved to any centre for slaughter under the provisions of these or any other regulations shall, on arrival, be immediately taken to such quarantine area (if any) as is provided for the purpose and immediately branded with the letters "V.D." on the near hip.

8. Cattle admitted to a quarantine area in terms of the last preceding section shall be slaughtered within twenty-one days of the date of admission, and shall not be permitted to leave the same except for the purpose of being slaughtered at the appointed abattoir, and if found outside such area, except for the said purpose, may be destroyed on the order of the Chief Inspector or Controller of Stock; provided, however, that the Chief Inspector may allow the removal of cattle from such an area under such conditions as he may prescribe.

Transport Cattle.

9. The use of cattle for draught purposes is prohibited except:—

(1) Within the boundaries of the places defined in section 3 (a), (b) and (c) hereof.

(2) Within the boundaries of areas already fixed for the use of cattle for draught purposes in terms of regulations published under Government Notice No. 329 of 1910, or such other areas as may be fixed by the Administrator.

10. Notwithstanding the provisions of section 9, no permit shall authorise the working of cattle

(a) which are not clearly and distinctly branded with the registered brand of the owner;

(b) in any wagon or vehicle which shall not have the owner's name and address legibly and permanently inscribed on the right side thereof.

11. No wagon or other vehicle drawn by oxen shall be moved from one cattle transport area into another without the permission of the Cattle Inspectors concerned, and under such conditions as they may impose.

General Provisions.

12. On the outbreak or suspected outbreak of disease, the Administrator may declare an area of infection around and embracing the place of outbreak or suspected outbreak, and a further area or areas around such area of infection as a guard area, whereupon all movement of cattle into and from place to place within such area or areas shall be immediately suspended, except as hereinafter provided.

A.—*In areas of infection and guard areas:—*

(1) Cattle in transit by rail may be moved through such area.

(2) Cattle from beyond the borders of Southern Rhodesia may be detrained within such area or areas *en route* to destination.

(3) Cattle for *bona fide* farming, dairy and slaughter purposes may be moved into such area or areas by permission of the Chief Inspector and under such conditions as he may impose.

B.—*In guard areas only:—*

Cattle may be moved into and from place to place within such area under the conditions of section 6 hereof.

13. The removal of green forage, hay, fodder, bedding reeds, manure or of such other articles as may be reasonably supposed capable of conveying infection, shall be prohibited from areas of infection, save and except with the special permission of the Administrator.

14. Whenever an area shall have been declared under section 12 hereof, every person within such area, or within such further area as may be specified by Government Notice, owning or in charge of cattle shall, upon the death or slaughter because of disease, suspected disease, or accident, of any such cattle, immediately report such occurrence through the nearest Cattle Inspector, Native Commissioner or Police Officer to the District Veterinary Surgeon.

15. Notwithstanding the provisions of these regulations, it shall be competent for the Chief Inspector of Cattle to authorise and direct the movement of cattle for the purposes of isolating, dipping, quarantine, or any other such objects as may be deemed necessary to prevent or suppress an outbreak of disease.

16. Whenever an area shall have been declared an area of infection or guard area in terms of section 12 hereof, any person who shall allow any cattle to stray or be otherwise removed, except as provided for in these regulations, from any one place within such area to another place, or from a place outside of to a place within such area, shall be guilty of an offence against these regulations.

17. All cattle within the limits of the various commonages and townlands, areas of infection and guard areas as declared under section 12 hereof, or depastured on common grazing ground, shall be dipped or sprayed at least once in every three days, unless the Chief Inspector shall authorise the extension of the time between such dipping or spraying, or the entire suspension of the same.

18. In all areas of infection and guard areas sheep and goats shall be dipped at such periods as may be directed by the Chief Inspector.

19. Whenever the owner, occupier, or manager of a farm shall adopt means of cleansing cattle running thereon, either by spraying, dipping, or by any other method, the Chief Inspector may order any natives or other persons having cattle on the same farm to cleanse such cattle, and the Native Commissioner of the district within which the farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed upon between the said owner, occupier or manager and the said native owners.

20. All permits for the removal of cattle issued under the provisions of the said Ordinance or of any regulations framed thereunder shall specify legibly and clearly on the face thereof the place from and to which such cattle may be removed, the route by which they shall travel, the number and brands of such cattle, the time allowed for the journey and such other particulars and conditions as it may be deemed expedient to provide.

21. No permit issued for the movement of cattle shall be taken to authorise any trespass in connection with such movement.

22. Notwithstanding the provisions of these regulations, it shall not be lawful for any owner of cattle to allow any such cattle to be on any road, public outspan, commonage, or any property other than that of the owner,

unless they are free from ticks or unless they have been effectively cleansed by dipping, spraying or other process, within fourteen days of being allowed on such road or other place. Any beast having ten or more ticks on it shall not be considered free from ticks.

23. Any person contravening the provisions of these regulations or the conditions set out in permits issued thereunder, shall, where no higher penalty has been by the said Ordinance or any other law provided, be liable in respect of each offence to a fine not exceeding £20, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months.

SCHEDULE "A."

VETERINARY DISTRICTS OF SOUTHERN RHODESIA.

(1) *Salisbury.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

32. Battlefields; 33. Hartley and Gatooma; 34. Gadzenia Station; 35. Makwiro Station; 36. Norton Siding; 37. Hunyani Tank; 38. 1645½ Peg B. & M. & R. Railways; 39. Salisbury A.; 40. Salisbury B.; 41. Salisbury C.; 42. Salisbury D.; 43. Arcturus; 44. Bromley; 45. Marandellas North; 46. Marandellas South; 48. Headlands Station; 49. Junction Mazoe and Lomagundi Railways; 50. 23-Mile Peg, Lomagundi Railway; 51. Passaford Station; 52. 35-Mile Peg, Lomagundi Railway; 53. Gwibi Tank Halt; 54. Banket, Lomagundi; 55. Eldorado, Lomagundi; 56. Selby Siding; 57. Mazoe; and 58. Kimberley Reefs.

(2) *Bulawayo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

1. Plumtree; 2. Marula Siding; 3. Figtree; 4. Westacre Junction; 5. Bulawayo Area; 6. Heaney Junction; 7. Bembesi Station; 8. Insiza North; 9. Insiza South; 10. Shangani North; 11. Shangani South; 14. Redbank; 15. Nyamandhlovu Station; 16. Malindi Station; 17. Wankies Area; 18. Matetsi Siding; 19. Matopo Terminus; 20. Sabiwa Siding; 21. Gwanda Station; 22. West Nicholson; 23. Belingwe; 59. Essexvale and Balla Balla Areas; 60. Stanmore Siding Area; 61. Filabusi Area.

(3) *Gwelo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

12. Somabula Siding; 13. Gwelo Station; 24. Selukwe Area; 25. Surprise Area; 26. Indiva Siding; 27. Lalapanzi; 28. Iron Mine Hill Siding; 29. Umvuma Siding; 31. Que Que Station.

(4) *Umtali.*

An area comprising the native districts of Umtali, Melsetter, Makoni and Inyanga.

No. 247 of 1915.] [23rd July, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notices Nos. 526 of 1914, 167, 175 and 179 of 1915, and in terms of section 12 of Government Notice No. 50 of 1912, declare the following to be areas of infection and guard areas :—

2. Umtali Native District.

(b) *Guard Area.*

The farms N'odzi and Nyagari and the Penhalonga Valley.

3. Melsetter Native District.

(a) *Areas of Infection.*

(1) Highlands, Rockwood and Joppa Farms.

(2) Clearwater, Nooitgedacht, Randfontein and Avontuur Farms.

(3) Enhoek, Ravenswood, Roslyn, Woodstock, Landsdown, Heilrand and Kenilworth Farms.

(4) Wolvedraai Farm.

(5) Houtberg Farm.

(6) Springfield Farm.

(b) *Guard Area.*

That portion of the native district of Melsetter south of the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri and the Nayanyadzi River.

No. 173 of 1916.] [12th May, 1916.

AFRICAN COAST FEVER.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Animals Diseases Consolidation Ordinance, 1904," to cancel Government Notices Nos. 375 and 393 of 1915, and, in terms of section 12 of Government Notice No. 50 of 1912, declare the following areas of infection and guard areas in lieu thereof :—

Salisbury and Mazoe Native Districts.

(a) *Areas of Infection.*

(1) Epworth, Adelaide and Glenwood farms.

(2) Sternblick farm.

(3) Bluff Hill farm.

(4) Borrowdale Estate, Helenvale, Glen Lorne, Luna, Carrickcreagh and Greystone farms.

(5) An area bounded by and including the following farms :—Belford Estate, Belford Estate No. 2, Belford Estate North, vacant land on which the Jumbo Mine is situated, Whitfield, Yarrowdale, 100 acre lots, vacant land, Tjibakwe and Belford Estate No. 3.

(b) *Guard Areas.*

(1) Sigaro farm.

(2) An area bounded by and including the following farms :—Stamford, Good Hope, Henricksen, Mabelreign and Tynwald.

(3) An area bounded by and including the following farms :—Naauwplaats, the southern boundary of Belford Estate, Mbebi, Great B, Spelonken, Thetford, Balkiza, Willesden, Welston, Teviotdale, Zizalisari Outspan, Avondale, Salisbury Commonage, Hatfield Estate, the eastern boundaries of Glenwood and Adelaide, Ventersburg, Dispute, Donnybrook, Caledonia, Gardiner, Father Hartmann, Chishawasha, The Crag, The Grove, Halstead, Chindamora Reserve, vacant land west of Poorti River, Glenhervie, Maggiesdale, Brundret, Spitzkop, Summerdale, Rockwood, Somerset, Southmoor, Howick Estate, Leeuw's Rust, Klein Kopjes, Oude Kraal and Mooi Leegte.

No. 177 of 1916.] [12th May, 1916.

AFRICAN COAST FEVER.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Animals Diseases Consolidation Ordinance, 1904," to declare, in terms of section 12 of Government Notice No. 50 of 1912, the following area of infection in the native districts of Mtoko, Mrewa and Marandellas :—

Description of Area.

An area bounded by a line drawn from the north-western beacon of Showers, along the western boundary of Showers, Gongwe, Magar, northern and western boundaries of Highlands, north-western and south-western boundaries of Allen, western boundary of Holton Estate, western and southern boundaries of Belmont Outspan, north-western boundary of White Gombola, western boundaries of Bonn, Calne, Wilton, northern and southern boundaries of Delta, and southern boundaries of The Cave and Mere; thence up the Macheke River to the south-western beacon of Monte Cassino; thence along the southern and eastern boundaries of Monte Cassino to its most northern beacon; thence in a direct line to the south-western beacon of Changwe Ranch No. 1; thence along the northern boundary of Fairfield Estate to the Nyagadzi River; thence down this river and the Ruenya River to the eastern boundary of this territory; thence along this boundary in a northerly direction to the Mazoe River; thence up that river to its junction with the Shambara River; thence up that river to Manyeu Mountain; thence in a straight line to the eastern beacon of the Msana Reserve; thence up the Inyagui River to the easterly beacon of Middlesex; thence along the northern boundaries of Middlesex, Kent, Suffolk, Sussex and Rupture and the eastern boundary of Argosy to the point first named.

No. 283 of 1915.] [20th August, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the following area of infection and guard areas :—

(a) *Area of Infection.*

The farm Quagga's Hoek, in the native district of Melsetter.

(b) *Guard Areas.*

(1) That portion of the native district of Melsetter north of and including the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri and the Nyanyadzi River.

(2) That portion of the native district of Umtali lying south of the Impodsi River from its junction with the Odzi River to its junction with the Shetora River, thence up the Shetora River to the farm Butler North and including that farm and Banti North.

No. 394 of 1915.] [29th October, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the following areas of infection :—

(1) Melsetter native district—the farms Rumble Rills, Groenvlei, Cecilton and Quagga's Hoek.

(2) Umtali native district—the farm Penkridge.

No. 66 of 1916.] [25th February, 1916.

AFRICAN COAST FEVER.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Animals Diseases Consolidation Ordinance, 1904," to declare, in terms of section 12 of Government Notice No. 50 of 1912, the following areas of infection in the native district of Melsetter :—

The farms Grass Flats, Moosgwe, Lombard's Rust and Diepfontein.

No. 128 of 1916.] [14th April, 1916.

AFRICAN COAST FEVER.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Animals Diseases Consolidation Ordinance, 1904," to declare, in terms of section 12 of Government Notice No. 50 of 1912, the following areas of infection in the native district of Melsetter :—

The farms Wolverhampton and Johannes Rust.

No. 155 of 1916.] [28th April, 1916.

AFRICAN COAST FEVER.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Animals Diseases Consolidation Ordinance, 1904," to declare, in terms of section 12 of Government Notice No. 50 of 1912, the following areas of infection in the native districts of Umtali and Melsetter :—

The farms Thabanchu and Helvetia.

No. 438 of 1915.] [26th November, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the farm Ostend, in the native district of Melsetter, to be an area of infection.

No. 381 of 1914.] [3rd September, 1914.

COMPULSORY DIPPING.

UNDER and by virtue of the powers vested in me by section 7 of the "Compulsory Dipping Ordinance, 1914," I hereby declare that the provisions of that Ordinance shall be applied in respect of cattle within the following areas from the date of issue of this Notice, dipping to take place at such intervals as the Chief Veterinary Surgeon shall direct.

The areas under the control of the Municipalities of Salisbury, Bulawayo, Gwelo and Umtali, the Sanitary Boards at Gatooma and Victoria, and the Village Management Boards at Que Que, Melsetter, Penhalonga, Marandellas, Hartley, Enkeldoorn, Avondale, Umvuma, Selukwe and Gwanda.

Further, I do hereby declare that a charge of one penny per head will be made in respect of all cattle dipped at Government dipping tanks, except unweaned calves, for which no charge will be made; and one penny in respect of all horses, mules and donkeys, and ½d. in respect of all sheep.

No. 70 of 1915.] [4th March, 1915.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notice No. 353 of 1913 and declare that within the area defined below, after date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

An area including parts of the native districts of Bulawayo, Umzingwane, Matopo, Bubi and Bulalima-Mangwe, bounded by and including the following farms :—

Lochard Block, Greenlands, Wessels, Allendale B, Oscardale, St. Ninian's, Fincham's, Inyati Reserve, Lortondale, Wynslay Estate, Greville, that portion of unalienated land lying south of a line drawn from the most westerly beacon of Dollar Block and the north-eastern beacon of Killegar, Killegar, Braemar Block, Portive, Robert Block, Induna, Waterfall, Dingaan, Rouxdale, Fundisi, Umkein, Seaborough, Devonby, Helenvale, Slight's, Billar's, Craiglee, Bluebonny, Ireland, Welcome, Paul's Rest, McGeer's Luck, Centenary Mission, Maritzburg, Springvale, Outspan No. 3, Tati Road, De Hoop, Anglesea, Mineral King, World's View, Matopo Block, Brethren in Christ Mission Farm, Absent, the unsurveyed land lying north of a line drawn from the south-east beacon of Absent to the south-west beacon of The Range, The Range, Clark's, Swaithe's, Limerick, Pioneer's Rest, Mayhill, Rietfontein, Bradford, Hamilton, Mayfair, York, Indina, Rathline, Westondale, sub-division A of Fochabers, Fochabers, Kodhwayo, Zimbile and Lochard Outspan.

No. 206 of 1915.] [25th June, 1915.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that within the area defined below, on and after the date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

All surveyed farms in the native district of Melsetter south of the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge and Biriwiri, including the Ingorima Reserves and Mafusi Reserve, and excluding the farms Umzelezwe, Nyagadzi, Mhungura, Pangela, Passage Mangani, Chengwe, Gumera, Umbugu, Nhori, Elongwe and Mamzwera.

No. 318 of 1915.] [3rd September, 1915.

AFRICAN COAST FEVER. COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that within the area defined below, on and after the date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip

at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

That portion of the native district of Melsetter north of and including the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri, and the Nyanyadzi River; and that portion of the native district of Umtali lying south of the Impodsi River from its junction with the Odzi River to its junction with the Shetora River, thence up the Shetora River to the farm Butler North and including that farm and Banti North.

No. 355 of 1915.] [1st October, 1915.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notice No. 527 of 1914, and declare that within the area defined below, on and after date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

An area in the Salisbury and Mazoe native districts bounded by and including the following farms :—Lilfordia, Saffron Waldon, Kilworth, Porta, Reserve, Clement's Plot, Warwickshire, Oatlands, Amalinda, The Rest, Langford, Saturday Retreat, Reserve, Odar, Stoneridge, Longlands, Seki Native Reserve, Dunstan Estate, Banana Grove, Mayfair, Galway Estate, Sebastopol, Gardiner, Gilnockie, Cromlet, Learig, Reserve, Meadows, Mount Shannon, Halstead, western portion of Chindamora Reserve, Pote, Valeria, Spelonken, Arnold's, Smithfield, Brundret, Spitzkop, Summerdale, Rockwood, Somerset, Southmoor, Howick Estate, Leeuw's Rust, Klein Kopjes, Oude Kraal, Mooi Leegte, Reserve, Bitton, Syston, The Lily and Killiemore.

No. 402 of 1915.] [5th November, 1915.

COMPULSORY DIPPING OF CATTLE: ENTERPRISE SECTION OF SALISBURY NATIVE DISTRICT.

UNDER and by virtue of the powers vested in me by section 2 of the "Compulsory Dipping Ordinance, 1914," I do hereby declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

Description of Area.

An area bounded by and including the following farms :—Halstead, Mount Shannon, The Meadows, Ivordale, Ivanhoe, Oribi, Colga, Neptune, Mashona Kop, Mashona Vlei, Vuta, Chinyika, Lonely Park, Grazeley, Guernsey, adjoining vacant ground, Cromlet, Father Hartmann, Chisha washa, Stuhm, The Springs, The Grove and Umritsur.

No. 423 of 1915.] [19th November, 1915.

COMPULSORY DIPPING OF CATTLE: MELSETTER AND UMTALI DISTRICTS.

UNDER and by virtue of the powers vested in me by section 2 of the "Compulsory Dipping Ordinance, 1914," I do hereby declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

Description of Area.

All surveyed farms and the Ingorima and Mafusi reserves, in the native district of Melsetter, excluding Umzelezwe, Nyagadzi, Mhunguru, Pangela, Passage, Mangani, Chengwe, Gumera, Umbugu, Nhori, Elongwe and Mamzwera; and including the following farms in the native district of Umtali: Tom's Hope West, Steynstroom, Thabanchu, Penkridge, Macandrews, Cronley and Lisnacloon.

No. 21 of 1916.] [21st January, 1916.

COMPULSORY DIPPING OF CATTLE: SALISBURY, MAZOE AND HARTLEY DISTRICTS.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," to declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

Description of Area.

An area bounded by and including the following farms:—St. Mary's, Stoneridge, Odar, Reserve, Saturday Retreat, Chizanza, Suum Cuique, Arbroath, Langford, The Rest, Amalinda, Oatlands, Warwickshire, Clement's Plot, Reserve, Porta, Lyndhurst, Riverside, Herren Hausen, Lilfordia, Killiemore, The Lily, Ballineety, Fairview, Spa, Passaford, Springvale, Mbebi, Umsasa, Great B, Christon Bank, St. Gerera, Willesden Farm, Borrowdale Estate, Luna, Glen Lorne, Gletwyn, Sternblick, Manresa, Caledonia, Sebastopol, Galway Estate, Mayfair, Nalire Reserve, Buena Vista and Seki Reserve.

No. 22 of 1916.] [21st January, 1916.

COMPULSORY DIPPING OF CATTLE: MAKWIRO AREA, HARTLEY DISTRICT.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," to declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip of standard strength at intervals not exceeding seven days

Description of Area.

An area bounded by and including the following farms:—Umfulia, Dorothy Hill, vacant land, Seigneury Reserve, Zimbo Junction, Serui Drift, Strathmore, Scotsdale, Cape Boys' Reserve, Railway Farm No. 22, vacant land between Railway Farm No. 21 and Spencer, Spencer, Railway Farm No. 23 Woodsgift, Railway Farm No. 25, Southwood, Northwood, Niklot, Rothwell Extension, Hunyani Estate, Hunyani Estate No. 2, Stanhope, Cromdale, Garthmor, Serui, Curlewood, Cotswold and vacant land and farms lying within a line from the most easterly beacon of Cotswold to the north-east beacon of Fort Martin, thence to the south-east beacon of Fort Martin and from there due south to the Umfuli River and down that river to the farm Umfulia.

No. 98 of 1916.] [17th March, 1916.

COMPULSORY DIPPING OF CATTLE: MARANDELLAS AND SALISBURY DISTRICTS.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," to declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

Description of Area.

An area bounded by and including the following farms:—Rakodsi, Longlands, Shepparton (portion of Lendy Estate), Progress, Rockery, Shortlands, Rastenburg, Loquat Grove, Cornwall, Norfolk, Middlesex, Kent, Suffolk, Sussex, Rupture, Argosy, Weir, Inandu, Seaton, Rapture, Sunny Fountains, Mangwendi Mission, Retreat and Springvale.

No. 159 of 1916.] [5th May, 1916.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Compulsory Dipping Ordinance, 1914," to amend Government Notice No. 98 of 1916 by substituting the word "fourteen" for "seven" in the last line, and adding after "days" the words "except during the months of June, July and August, when the intervals shall not exceed twenty-eight days."

No. 126 of 1916.] [14th April, 1916.

COMPULSORY DIPPING OF CATTLE: SHAMVA AREA, MAZOE DISTRICT.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," to declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

An area bounded by and including the following farms:—The Carse, Burnleigh, Woodlands, Ceres, Murgwi, Zombi, Chewarika, Maienzi, Maxton, Lone Star Reserve No. 2, Richlands, M. E. D. Reserve, New Brixton, Dillon, Mullingar, Mumwi, Chipoli, Ellerslie, Wolley, Wapley, Lion's Den, and thence from the south-eastern beacon of Lion's Den up the Poorti River to the north-western beacon of The Carse.

No. 200 of 1916.] [26th May, 1916.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 7 of the "Compulsory Dipping Ordinance, 1914," to declare that the provisions of that Ordinance shall be applied in respect of cattle within the area under the control of the Village Management Board at Blinkwater from the date of this notice, dipping to take place at such intervals as the Chief Veterinary Surgeon shall direct.

No. 337 of 1915.] [17th September, 1915.

ENZOOTIC ABORTION.

IT is hereby notified for public information that nothing contained in the several Government Notices declaring certain areas to be actively infected with the disease known as enzootic abortion, for the purposes of the "Animals Diseases Consolidation Ordinance, 1904," and the "Animals Diseases Amending Ordinance, 1911," shall be taken to prohibit the movement of oxen to, from or through such areas, subject to compliance with the laws and regulations governing the movement of cattle.

No. 186 of 1914.] [23rd April, 1914.

IMPORTATION OF CATTLE.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel the regulations published under Government Notice No. 128 of 1914, and make the following provisions in lieu thereof :—

1. The importation of cattle will be permitted from the Cape Province, the Orange Free State and the Transvaal on the following terms and conditions :—

(1) A permit shall be required from the Chief Inspector, which may contain such conditions as shall from time to time appear expedient.

(2) The importation of cattle with more than two permanent central incisor teeth shall not be permitted, except that animals entered in the South African Stud Book or the appendix thereto, with not more than the first and second pairs of permanent incisors, may be imported.

(3) Applications for permission to import shall be in the form "A" attached hereto, and accompanied by a declaration in the annexed form "B."

(4) All importations shall be by rail, and for the purposes of importation, Bulawayo shall be the port of entry.

(5) All cattle imported in terms of these regulations shall, on arrival at Bulawayo, Salisbury or Umtali, be submitted to such examination or tests as the Chief Inspector may direct. If such examination or tests disclose the existence of any destructive disease, the cattle shall be immediately destroyed and the carcases thereof disposed of in such a manner as a Government Veterinary Surgeon may authorise or require. The Chief Inspector may permit of the age restriction and the tests aforesaid being dispensed with in the case of cattle in transit by rail to any place beyond the borders of Southern Rhodesia.

(6) All expenses or losses incident to quarantine, examination, testing or destruction as aforesaid shall be borne by the owner of the cattle.

2. The importation of cattle from the United Kingdom of Great Britain and Ireland, the United States of America, the Kingdom of the Netherlands and Germany will be permitted under the following terms and conditions :—

(1) Importation shall be through and direct from the ports of Cape Town or Port Elizabeth, and there shall be a consignment note or other satisfactory evidence that cattle so imported have come direct from one of the above-mentioned countries.

(2) The provisions of sub-sections (1), (5) and (6) of section 1 hereof shall apply to importations in terms of this section.

3. Any person introducing cattle in contravention of these Regulations, or failing to comply with any of the conditions attached to permits to import, or furnishing applications, declarations, or other necessary documents known to be false in any material particular, or failing to comply with all lawful directions as to quarantine, examination, testing, destruction or disposal of carcases, shall be liable to a fine not exceeding £20 for each animal in respect of which such offence shall have been committed, and in default of payment to imprisonment with or without hard labour for any period not exceeding six months, unless higher or greater penalties shall have been provided for such offences by the "Animals Diseases Consolidation Ordinance, 1904"; provided, however, that the penalties imposed by these Regulations shall not exempt any cattle from destruction in terms of the aforesaid Ordinance.

ANNEXURE "A."

APPLICATION FOR CATTLE IMPORTATION PERMIT.

1. Applicant's Name and Address.....
2. Number and Class of Cattle to be imported.....
3. Area or Farm and District where Cattle are at present located.....
.....
4. Area or Farm and District to which Cattle are to be moved.....
.....

Applicant's Signature.....

Date.....
Application.....
Permit No.....

ANNEXURE "B."

I, ... residing on the farm ..... in the district of ..... do solemnly and sincerely declare that the ..... (number in writing) animals also enumerated below have been in my possession since birth, and that Lungsickness (Contagious Pleuro-Pneumonia) has not existed amongst any of my cattle, nor on my farm, during the last four years, and that these animals have never been exposed for sale in any public market or stock fair.

Number of Animals ..... Bulls ..... Heifers .....
Breed .....
Seller's Name and Address .....
.....
Purchaser's Name .....
Place in Southern Rhodesia to which animals are being sent
.....
And I make this solemn declaration conscientiously believing the same to be true.
.....
Declared to at ..... on this ..... day of.....
before me,
.....
Resident Magistrate for the District of .....

IMPORTATION OF STOCK FROM THE PROVINCE OF THE CAPE OF GOOD HOPE.

WITH reference to Departmental Notice of 28th February, 1912, it is hereby notified that the said Notice is cancelled, and importation of stock will now be permitted, in terms of Government Notice No. 110 of 1908, from the Province of the Cape of Good Hope, with the exception of the following districts :—

Komgha
East London
Peddie
Victoria East
Kingwilliamstown
Stutterheim
Cathcart
Stockenstroom
Queenstown (Gwatyu Ward only)
Glen Grey
Maclear
Elliot Slang River
Wodehouse
Barkly East

No. 169 of 1916.] [5th May, 1916.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Animals Diseases Consolidation Ordinance, 1904," to permit, under the terms and conditions of sub-sections (1), (5) and (6) of section 1 of Government Notice No. 186 of 1914, the importation from the Cape Province, Transvaal, Orange Free State and Natal of pure-bred cattle originally imported from the United Kingdom of Great Britain and Ireland, the United States of America and the Kingdom of the Netherlands. Every application for permission to import shall be accompanied by a certificate in the form of the annexure attached hereto.

ANNEXURE.

I.....residing on the farm.....in the district of.....in the Union of South Africa, do solemnly and sincerely declare that the.....(number in writing) animals enumerated below have been in my possession for.....and that lung-sickness has not existed amongst any of my cattle during that period; and further, that such animals are not prevented by any regulations or agreement in respect of freight from being exported from the Union.

Description of Animals.

Breed.	Stud Book in which entered.	Sex, Name and Number in Stud Book.	Country of Origin.
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....

And I make this solemn declaration conscientiously believing the same to be true.

.....

Declared to at.....on this.....day of..... 19.....before me,

.....

Resident Magistrate for the district of.....

Names of former owners.....

.....

No. 364 of 1914.] [27th August, 1914.

REGULATIONS GOVERNING IMPORTATION OF LIVE STOCK, ETC.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended from time to time, I do hereby cancel the regulations published under Government Notices Nos. 295 and 394 of 1908; 38, 61 and 263 of 1909; and 60 of 1911 and 188 of 1912, 47 of 1913, and so much of any other regulations as may be repugnant to or inconsistent with the subjoined regulations, which are hereby declared to be of full force and effect.

1. The importation of the following animals from the respective countries or districts enumerated is prohibited, owing to the existence or supposed existence of destructive diseases affecting the said animals in the said countries:—

(1) All animals and dogs as defined by the aforesaid Ordinance from—

India,
Mauritius,
Persia,
British Burmah,
Assam,
China and bordering countries, including Korea,
French Indo-China,
Dutch East Indies,
Hong-Kong,
Federal Malay States,
The Philippines,
Zanzibar,
and all other countries where surra is known or suspected to exist.

(2) Pigs from the Union of South Africa, the Bechuanaland Protectorate, the Tati Concession, and other countries in which swine fever exists or is suspected to exist, subject, however, to the exceptions contained in the proviso to this section.

(3) Dogs from the territories of Northern Rhodesia and Portuguese East Africa, subject, however, to the exceptions in the proviso of this section.

(4) Sheep and goats from the districts of Albany, Alexandria, Bathurst, Bedford, East London, Fort Beaufort, Humansdorp, Jansenville, Kingwilliamstown, Komgha, Peddie, Somerset East, Stockenstroom, Uitenhage and Victoria East, in the Cape Province; the districts of Barberton, Lydenburg, Marico, Pretoria, Rustenburg, Waterberg and Zoutpansberg, in the Transvaal; Swaziland, Portuguese East Africa, Northern Rhodesia.

Provided, however—

(a) that the Chief Inspector may at his discretion permit the importation of pigs, sheep and goats from the above-mentioned places on production of a certificate signed by a duly authorised Government Veterinary Officer in the form of Schedule "A" attached hereto;

(b) that the importation of dogs required for scientific purposes only may be permitted from the places mentioned in sub-section (3) hereof, by the Chief Inspector, in writing, subject to such conditions as may be imposed by him;

(c) that dogs, sheep, goats and pigs from countries from which importation is permitted may be introduced *via* the port of Beira, provided that all such animals shall be transferred directly after disembarkation to the railway trucks at Beira, and conveyed thence to Umtali without leaving the said trucks.

2. The areas set out in Schedule "B" hereto are hereby appointed for the depasturing and quarantining of animals for slaughter in connection with the places therein mentioned.

3. The several districts of Southern Rhodesia are hereby declared to be an area infected with scab amongst sheep and goats, and the movement of all sheep and goats from any farm to beyond the limits thereof, or from their usual grazing ground within the limits of any town lands or native reserves to any other place, is prohibited, except under the written permit of an Inspector or Sub-Inspector. Such permit shall set forth the number and description of animals to be moved, the route they shall travel, and the period for which the permit shall be in force. In cases where it may be necessary or desirable, the person to whom such permit is issued may be required to cause the animals referred to therein to be dipped before being moved.

4. The introduction of sheep and goats is prohibited except—

(a) as specially provided for by section 1 hereof:

(b) from places not mentioned in section 1, if accompanied by a certificate in the form set out in Schedule "C" hereof.

5. The owner or person in charge of any horse, mule or donkey entering Southern Rhodesia by rail shall immediately report such arrival to the Veterinary Office at Salisbury, Bulawayo and Umtali respectively, and no such animal shall be detrained at any intermediate station without the written authority of a Government Veterinary Surgeon.

6. The owner or person in charge of any horse, mule or donkey entering Southern Rhodesia by road shall immediately report such arrival at the Police Camp nearest to the place where such entry is made, and the officer in charge of such Police Camp shall immediately report to the Veterinary Department, which shall direct what steps are to be taken to test such animals with mallein, as in the following clause provided.

7. All horses, mules and donkeys, upon entering Southern Rhodesia, shall be tested with mallein, and the owner or person in charge of such animals shall in all respects carry out the lawful directions of the Inspector while such animals are being tested; provided that this regulation shall not apply to animals in transit through Southern Rhodesia which are not detrained *en route*.

8. Horses, mules and donkeys lawfully in this Territory, and required for purposes necessitating frequent crossing of the border, may be allowed to so cross on such terms as to registration, branding, testing and conditions as the Chief Veterinary Surgeon may from time to time deem expedient to prescribe.

9. An Inspector may direct the thorough cleansing and disinfecting of trucks which may be reasonably suspected of being sources of infection of any destructive disease, and may direct the destruction of truck fittings, fodder, excreta, or other matter or thing which may be reasonably calculated to convey such infection.

10. Any persons contravening the provisions of these regulations, or the instructions or directions given in terms of these regulations, shall be liable in respect of each offence to a penalty not exceeding twenty pounds, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months, unless where more or heavier penalties have by the aforesaid Ordinance, or by other regulations framed thereunder, been expressly provided.

SCHEDULE "A."

Certificate.

Issued under provisions of section 1, Government Notice No. 364 of 1914.

This is to certify that the animals enumerated below are, in my opinion, free from any destructive disease, including heartwater; and, to the best of my knowledge and belief, have not been in contact with any infected animals, nor come from, or through, a locality where any such disease is known to exist or has existed for twelve months from date hereof.

Date....., 19...

Place .....

.....

Signature of
Government Veterinary Surgeon.

Number and general description of animals :
.....Pigs, ...Sheep, ...Goats.

Place from which animals are to be sent :

.....

Owner's name and address :

.....

.....

Place in Southern Rhodesia to which it is desired to send the animals

.....

SCHEDULE "B."

Description of areas set apart for depasturing and quarantining of animals for slaughter.

Salisbury.—A fenced piece of land, 400 acres in extent, situated on the Makabusi River below Maggio's plot, within the Salisbury commonage and towards the southern boundary thereof.

Bulawayo.—That piece of fenced land situated on the Bulawayo commonage between the railway line, to the south, and the Solusi road, adjoining and to the south-west of the Government dipping tank, in extent 1,000 acres more or less.

Gwelo.—Starting from a point where the Ingwania road crosses the railway, along this road past the sanitary stables to a point a quarter of a mile west, thence in a line parallel with the railway to the Gwelo River, thence along the river to the commonage beacon No. 11, thence in a straight line to the Shamrock road where it is intersected by the Scout's Spruit, thence along the Shamrock road to where it joins the Main Street extension, thence along this to the railway line, and down this to the starting point.

Umtali.—A piece of fenced land situated on the old Darlington Farm section of the Umtali commonage.

Penhalonga.—A piece of fenced land situated on plot No. 2, Imbeza plots.

Selukwe.—A piece of fenced land, in extent about 300 acres, situated on the farm Sebanga and adjacent to the township of Selukwe.

SCHEDULE "C."

I, ... residing at .....
in the district of... ..... in the.....
Colony, do solemnly and sincerely declare that the animals enumerated below are free from any contagious disease, including scab, and have not been in contact with any infected animals within six months from date hereof, and that, to the best of my knowledge and belief, such animals, in travelling to.....† station, will not come in contact with any animals amongst which scab or any other contagious disease exists.

And I make this solemn declaration conscientiously believing the same to be true.

.....

Declared to at.....on this.....
day of.....before me.

.....
Magistrate, Government Veterinary Surgeon, Scab Inspector, or Police Officer of district from which animals are being sent.

Number and general description of animals being sent.....
Owner's name and address.....
.....
Place in Southern Rhodesia to which animals are being sent.....

† Station within Colony of origin.

No. 442 of 1914.] [15th October, 1914.

ISSUE OF PERMITS FOR THE REMOVAL OF STOCK.

IT is hereby notified for public information that His Honour the Administrator has approved of members of the British South Africa Police

issuing permits for the removal of cattle, sheep and goats at the undermentioned stations when no Inspector or Sub-Inspector of Cattle is available :—

Nyamandhlovu.	Mphoeng's.
Gwanda.	Holi.
Plumtree.	Filabusi.
Fort Rixon.	Gwaai.
Belingwe.	Figtree.
Inyati.	Umvuma.
Fort Usher.	Que Que.

No. 410 of 1915.] [12th November, 1915.

ISSUE OF PERMITS FOR REMOVAL OF STOCK.

IT is hereby notified for public information that His Honour the Administrator has approved of members of the British South Africa Police issuing permits for the removal of cattle, sheep and goats at the undermentioned stations when no Inspector or Sub-Inspector of Cattle is available :—

Mazunga.	Tuli.
Makwiro.	Sinoia.
Banket Junction.	Buhera.
Makaha.	

No. 12 of 1916.] [14th January, 1916.

ISSUE OF PERMITS FOR REMOVAL OF STOCK.

IT is hereby notified that His Honour the Administrator has approved of members of the British South Africa Police issuing permits for the removal of cattle, sheep and goats at the Beatrice Mine.

No. 172 of 1916.] [12th May, 1916.

ISSUE OF PERMITS FOR REMOVAL OF STOCK.

IT is hereby notified that His Honour the Administrator has approved of members of the British South Africa Police issuing permits for the removal of cattle, sheep and goats at Wedza, in the native district of Marandellas, when no Inspector or Sub-Inspector of cattle is available.

No. 375 of 1912.] [28th November, 1912.

IMPORTATION OF POULTRY.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended by the "Animals Diseases Amendment Ordinance, 1910," I do hereby declare and make known that the following regulations shall be in force and effect from date of publication hereof :—

(1) All poultry imported by rail shall be inspected by an Inspector or Sub-Inspector at Plumtree, Bulawayo or Umtali.

(2) Should any consignment of poultry shew symptoms of disease, or should such Inspector or Sub-Inspector have reason to believe that any disease exists in, or that infection is likely to be conveyed by such consignment, he may order the detention and isolation of the whole consignment for such period as he may deem necessary.

(3) The Chief Inspector may order the destruction of all poultry which he has reasonable grounds for believing to be diseased or likely to convey infection.

THE following extract from Live Stock Regulations, printed on page 150 of the South African Railways Official Tariff Book, is published for general guidance :—

Poultry are not accepted by rail unless they are placed in a crate and the following conditions are complied with :—

(1) The size of the crate shall be 3 feet 6 inches by 2 feet 9 inches external floor dimensions; for turkeys and geese the height shall be 30 inches: and for fowls, ducks, and poultry of a like size, the height shall be 20 inches.

(2) Each crate must contain two drinking vessels filled with pure water, such vessels to be not less than five inches in depth, of the unspillable type, one being fixed at opposite corners of the coop.

(3) Each crate shall contain two receptacles for food of a suitable size, filled with suitable food other than whole maize.

(4) The birds must not be over-crowded in the crates, and in no case must there be more than 20 fowls, ducks or other birds of a like size, or ten turkeys or geese

(5) Different species of birds must not be placed in the same coop.

Unless coops, crates, and the like are strong enough to bear ordinary transit handling, the Administration will not accept responsibility for loss.

No. 182 of 1916.] [19th May, 1916.

POUND AT LALAPANZI.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 5 of "The Pounds and Trespasses Ordinance, 1903," at the request of the Civil Commissioner, Gwelo, to declare and make known that the pound on the farm Lalapanzi, established by Government Notice No. 112 of 1912, is hereby abolished as from 24th April, 1916, and that a pound has been established on the farm Hillview, near Lalapanzi, in the magisterial district of Gwelo, and that the said pound shall be available for the public as from that date.

SUMMARY OF THE GAME LAWS.

Game is divided into three distinct classes, described as follows :—

(a) Birds and Small Buck.

(b) Bushbuck, Hartebeest, Impala, Lechwe, Pookoo, Roan and Sable Antelope, Sitatunga, Tsessebe, Waterbuck, and Wildebeest.

(c) Royal Game, which includes Eland, Elephant, Giraffe, Gemsbok, Hippopotamus, Inyala, Koodoo, Ostrich, Rhinoceros, Springbuck and Zebra.

The shooting season for Class "A" is as follows :—

In Mashonaland :

Birds from 1st May to 30th September.
Small Buck from 1st May to 31st October.

In Matabeleland :

Birds and Small Buck from 1st May to 31st October.

To shoot in Class "A" a licence costing £1 per annum is required. This entitles holders to hunt in both Provinces during the open season.

Class "B."—The season opens on 1st July and closes on 30th November in both Provinces. The licence fee is £25 for non-residents and £5 for persons having their domicile in Southern Rhodesia. This licence entitles the holder to shoot up to 15 head, which number may be increased to a total of 25 upon payment of a further sum of £15 in the one case and £5 in the other.

Class "C."—The Administrator may, if he is satisfied that the animals are actually required for scientific purposes, grant to the holder of a game licence permission to shoot or capture any of the species included in this Class. Such permit requires a £5 stamp. Applications in writing, together with proof of *bona-fides*, should be addressed to the Director of Agriculture.

Game for Farming Purposes.—Permits may be granted for the capture of Eland, Ostrich, Zebra or other animals for the purposes of breeding or farming. Such permits require a stamp of the value of £1 and remain in force for six months. Application, accompanied by a sworn declaration, should be made through the Director of Agriculture or the Civil Commissioner of the district.

Game Injuring Crops.—The occupier of any cultivated land or any person acting under the authority of such occupier, may at any time destroy game actually doing damage on such land.

Export of Game.—No living Game or the Eggs of any Game Birds may be exported beyond the limits of Southern Rhodesia without a written permit.

Shooting on Private Land.—A licence does not entitle the holder thereof to shoot on private land without the permission of the land-owner.

Farmers Shooting Game on their Farms.—By taking out a special £1 licence, farmers may at any time shoot any game on their land. "Game" does not include any birds, except ostriches.

Open Area.—The shooting or capturing of all classes of game with the exception of ostriches and other birds classified as game is permitted within the following area in the Hartley district until further notice :—

Hartley District.—From the railway bridge on the Umfuli River, thence north-westwards along the Umfuli River to where it joins the Umniati River, thence southwards along the Umniati River to where it joins the Umsweswe River, thence eastwards along the Umsweswe River up to the drift at the Lydia Mine, thence along the old road from Lydia Mine to Etna Mine and to Inez Mine, thence northwards along the road from Inez Mine to Hartley, thence in the direction of the railway bridge to the starting point on the Umfuli River.

The game specified may be shot in this area without a licence.

Protected Area.—All game is strictly preserved in the Urungwe Game Sanctuary as defined below :—

An area in the Lomagundi district, bounded as follows : On the north and west by the River Zambesi, starting at the point where the Lozenzi River joins the Zambesi, and following the course of the latter river to its junction with the Sanyati River ; on the east by an imaginary line drawn from the junction of the Indurune and the Nyaodsa Rivers to the head-waters of the Lozenzi River, and thence along the course of the Lozenzi River to its junction with the Zambesi River ; on the south by an imaginary line drawn due west from the point of junction of the Indurune and Nyaodsa to the Sanyati River, thence along the course of this river to where it enters the Zambesi.

Game in Class "A" may be hunted in the close season until further notice on private land in the Melsetter district by holders of a licence.

"Locust Birds" are strictly protected, *vide* Government Notice No. 390 of 1912.

Elephants on Occupied Farms, Melsetter.—The destruction of Elephants when found on occupied farms on the High Veld in Melsetter District is authorised (*vide* Government Notice No. 284 of 1908).

Trespassing on native reserves, in pursuit of game or otherwise, is prohibited, except with the written permission of the Chief Native Commissioner.

Trypanosomiasis.—Persons in search of game in the southern part of the Sebungwe district are warned of the danger of hunting anywhere west of the Sengwe and Lutope Rivers within the fly area, and especially of proceeding anywhere within the valley of the Busi River.

No. 183 of 1916.] [19th May, 1916.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 4 (2) of the "Game Law Consolidation Ordinance, 1906," to suspend the operations of sections 9, 10 and 12 of the said Ordinance in so far as they relate to the killing, hunting or capture of game in Class "A" in the native districts of Victoria, Ndanga, Gutu and Chibi, for a period of six months from date hereof.

No. 86 of 1916.] [10th March, 1916.

CANCELLATION OF OPEN SHOOTING AREA IN THE LOMAGUNDI DISTRICT.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Game Law Consolidation Ordinance, 1906," to cancel from date hereof Government Notice No. 273 of 1915, which suspended the operations of sections 9, 10 and 12 of the said Ordinance in respect of all game, with the exception of ostriches and other birds classified as game, within a certain area in the Lomagundi district.

No. 87 of 1916.] [10th March, 1916.

CANCELLATION OF OPEN SHOOTING AREA IN THE SEBUNGWE DISTRICT.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Game Law Consolidation Ordinance, 1906," to cancel from date hereof Government Notices Nos. 227 of 1913 and 312 of 1914, which suspended the operations of sections 9, 10 and 12 of the said Ordinance in respect of all game, with the exception of ostriches and other birds classified as game, within a certain area in the Sebungwe district.

No. 160 of 1916.] [5th May, 1916.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Game Law Consolidation Ordinance, 1906," to declare

that the provisions of Government Notice No. 171 of 1915, under which the shooting, hunting or destruction of all game within the limits of the commonage or townlands of Umtali was prohibited up to the 30th April, 1916, shall remain in force for a further period of one year from the 1st May, 1915.

No. 201 of 1916.] [26th May, 1916.

REWARD FOR THE DESTRUCTION OF WILD DOGS.

HIS Honour the Administrator in Council has been pleased to approve payment of a reward of five shillings for each wild dog destroyed whose destruction is reported and the reward claimed in the manner hereunder set forth.

Rewards will be paid to Europeans by any Magistrate or Native Commissioner and to natives by any Native Commissioner within three months of the date upon which the animal is killed, on a solemn declaration in the form hereinunder prescribed.

In proof of destruction, applicants for the reward will be required to produce and surrender the skin of the animal with the tail not severed.

Form of Declaration.

I,....., do solemnly and sincerely declare that I did, on the.....day of....., and not before, destroy.....wild dog(s) in the district of....., within the boundaries of Southern Rhodesia, and that I am entitled to the reward offered by the Government, and I make this solemn declaration conscientiously believing the same to be true.

.....
Signature.

Signed and declared at.....this.....day of .....

Before me,

.....
Magistrate or Justice of the Peace.

No. 249 of 1908.] [27th August, 1908.

PROTECTION OF TREES.

IT is hereby notified for public information that any person who shall cut down for use as fuel, or for any other purposes than *bona-fide* farming, mining or manufacturing purposes, or cause to be so cut down the "Wild Westeria" (native name M'Pakwa or M'poea) tree, will be liable to prosecution for contravention of the provisions of the Forest and Herbage Preservation Act, 1859, and upon conviction to a fine not exceeding £100, or to imprisonment with or without hard labour for a term not exceeding six months, or to such fine and imprisonment, or to such imprisonment without a fine.

No. 163 of 1909.] [29th July, 1909.

ANY person who shall cut down or destroy, or cause to be cut down or destroyed, the "Shuma" or "Mashuma" tree, except under written authority from the Estates Office of the British South Africa Company, and subject to such conditions as may be imposed therein, will be liable to prosecution for contravention of the "Forest and Herbage Act, 1859," and, upon conviction, to a fine not exceeding £100, or to imprisonment, with or without hard labour, for a term not exceeding six months, or to such fine or imprisonment, or to such imprisonment without fine.

No. 138 of 1916.] [21st April, 1916.

APPLICATIONS FOR USE OF WATER

in terms of Chapter I. of the "Water Ordinance, 1913."

IT is hereby notified that the following applications have been made, in terms of the "Water Ordinance, 1913," for authority to use water :—

Name of applicant.	From what river.	Native district of	For the purpose of irrigating a certain portion or portions of the
British South Africa Co.	Odzi	Makoni	Farm Odzi and for working meat-canning factory
E. K. Evans -	,,	Umtali	Farm Odzi Falls
British South Africa Co.	Umrodzi	Mazoe	Simoona Reserve
F. A. Readman -	Chitende	Victoria	Farm Campsie Glen
L. S. A. Vereker -	Mwindsi tributary	Salisbury	,, Carrickcreagh
E. W. L. Noaks -	Umrodzi	Mazoe	,, Limbeck—No. 38, Glendale

Any person or persons whose rights may be affected thereby are hereby called upon, in terms of the regulations published under Government Notice No. 439 of 1915, to lodge, within three months from the date hereof, at the office of the Water Registrar, Salisbury, from whom further particulars are obtainable, their objections (if any) to the granting of these applications, together with a full statement of the grounds for such objections.

Department of Posts and Telegraphs,

Southern Rhodesia.

Postal Notice No. 12 of 1913.

AGRICULTURAL PARCELS POST.

IT is hereby notified for public information that, on and after the 1st August, 1909, any article produced, and, if manufactured, produced and manufactured within Southern Rhodesia may be transmitted by Agricultural Parcels Post at the reduced rate of threepence per lb. or fraction thereof, up to a limit of eleven lbs. in weight.

The Agricultural Parcels Post is designed to bring the producer into direct communication with the consumer, and is available for the transmission of :—

Biscuits	Dried Meats	Plants
Bread	Eggs	Poultry
Butter	Flour	Seeds
Confectionery	Flowers	Sugar
Cigarettes	Honey	Tobacco
Dried & Bottled Fruits	Jam	Wool Samples

and other articles produced within Southern Rhodesia. It does not extend beyond the borders of Southern Rhodesia.

The senders of articles at the reduced tariff applicable to the Agricultural Parcels Post will be required to sign a declaration that the contents are the *bona fide* produce of Southern Rhodesia.

The limits of size and weight, and the general regulations, are those applicable to the Inland Parcels Post.

G. H. Eyre,
Postmaster General.

General Post Office, Salisbury,
31st March, 1913.

RHODESIA

Agricultural Journal.

ISSUED BY

The Department of Agriculture,

SALISBURY, RHODESIA.

ADVERTISEMENTS.

The Journal is issued every alternate month.

Application for advertising space should be addressed to the Editor. The rates are as follows, *per issue*:—

Position.	Whole page. £	s.	d.	Half page. £	s.	d.	Quarter page. £	s.	d.
Inner pages - -	**2**	**0**	**0**	**1**	**5**	**0**	**0**	**15**	**0**
Outer cover (back) -	**4**	**0**	**0**		—			—	
Inner covers (back and front) and page facing Contents	**3**	**0**	**0**	**1**	**15**	**0**	**1**	**0**	**0**

A discount of 10 per cent. will be allowed for standing or consecutive advertisements running through six issues. Remittances, and electros where desired, should accompany orders. The right is reserved to discontinue the insertion of standing or consecutive advertisements should payment beyond the second issue be delayed.

The right of approval of all advertisements by the Director of Agriculture is reserved, and his decision as to the acceptance or rejection is final.

An additional charge may be made for advertisements printed in special type, equal to any additional charges made by the printers for setting up same.

Advertisements will be accepted from *bona fide* farmers wishing to effect sale, purchase or exchange of produce, live stock or farm implements, at a minimum charge of 2/6 per insertion of 20 words. Extra words will be charged for at the rate of 1/- for every 10 words.

CHALLENGE CUP
Presented by
THE LIEBIG EXTRACT OF MEAT COMPANY LIMITED
TO THE
NEW SOUTH WALES AGRICULTURAL SOCIETY
1916

THE RHODESIA

Agricultural Journal.

Edited by the Director of Agriculture,
assisted by the Staff of the Agricultural Department.

PUBLISHED BI-MONTHLY.

VOL. XIII.—NO. 4.] AUGUST, 1916. [5s. per annum.

Editorial.

Correspondence on subjects affecting the farming industry of Southern Rhodesia is invited. Enquiries will be replied to direct, or through the medium of the JOURNAL. *An interchange of ideas and suggestions between farmers will be particularly welcomed. Contributions of a suitable nature for insertion in this* JOURNAL *will be much appreciated. All communications regarding these matters, and advertisements, should be addressed to the Editor, Department of Agriculture, Salisbury.*

CO-OPERATION IN MATABELELAND.—A year ago this month we recorded the establishment of the Matabeleland Farmers' Co-operative Society and gave an outline of the principal rules of its constitution. We now have pleasure in referring to the first annual general meeting of this Society, which was held in Bulawayo on 1st July. The speech of the President, Mr. R. A. Fletcher, makes excellent reading, for it shews, not only that the Society has had a successful year, but that the co-operative idea has taken firm root in Matabeleland. The difficulties incident to the initiation of a new enterprise have been overcome, and the opposition that always faces an

attempt at co-operation amongst producers has been resisted. This opposition, strange to say, comes from some of the farmers themselves, whose interests are served by the Society, as well as from certain consumers and middlemen, who fear that their interests are threatened. Although the Bulawayo Society is in the day of small things, in reality its programme is more ambitious than that of the sister Society in Salisbury, for, while under the rules of the latter its members must sell their maize crop only through the Society, in Matabeleland the members bind themselves to dispose of practically all their different crops, except tobacco, as well as their slaughter stock, through the Society. Both Societies began on the same lines, that is by placing the management of their affairs for the first year in the hands of local firms of standing and repute, with the option of taking over later for direct control by the committee. It is pleasant to note that a business arrangement exists between the two Societies and is working well. This is most satisfactory and important from the point of view of the country as a whole and the farmers in particular. We congratulate the farmers of Matabeleland, and cannot wish them anything better than that their Society may flourish and grow as the Mashonaland Society has done.

Rhodesian Tobacco for Australia.—The opportunity was taken by the Government and the Rhodesia Tobacco Co-operative Society of the visit of Mr. W. M. Hughes, P.C., Premier of the Australian Commonwealth, to South Africa to represent to him certain points in connection with the working of the preferential rates granted on Rhodesian tobacco exported to Australia, particularly with a view to securing that the benefits of this favourable tariff should reach the producer. Mr. Hughes met the Treasurer, the Controller of Customs and the Manager of the Society, and it is understood that an instructive and useful exchange of views took place. No definite decisions could, of course, be reached, but it is at least a satisfaction to know that the interests of Rhodesia were brought directly to the notice of one of the chief apostles of colonial preference, and that there is good prospect of the representations made receiving sympathetic consideration at a very early date.

South Devon Bull "St. Patrick," property of Mr. C. F. Browning, Salisbury.

Export of Rhodesian Tobacco to Britain.—It will be remembered that some time ago the British Government issued a proclamation prohibiting the importation of tobacco into the United Kingdom. In this connection a committee was appointed to advise the Government as to the issue of licences for importation in special circumstances. Representations were made that the only tobaccos which resembled or could replace Virginia leaf were those grown in Rhodesia and Nyasaland. As a result the committee has been empowered to issue licences for the importation of "any tobacco, manufactured or unmanufactured, the produce or manufacture of any part of His Majesty's Dominions." This privilege extends to Rhodesia, and we need hardly emphasise the great importance and advantage it is to our local industry that the open door to the Home market has been maintained. It is also interesting to note that, while at the beginning of the war the War Office specification of tobaccos required by the army did not include any tobaccos grown in British territories, now, thanks to the intervention of the Imperial Institute, the specification has been so modified as to allow the use of tobacco of satisfactory quality grown in any British colony or protectorate, and, as a consequence of this concession, Rhodesian tobaccos are being largely employed for the manufacture of pipe mixtures and cigarettes supplied under contract to the army, and we understand they are much esteemed.

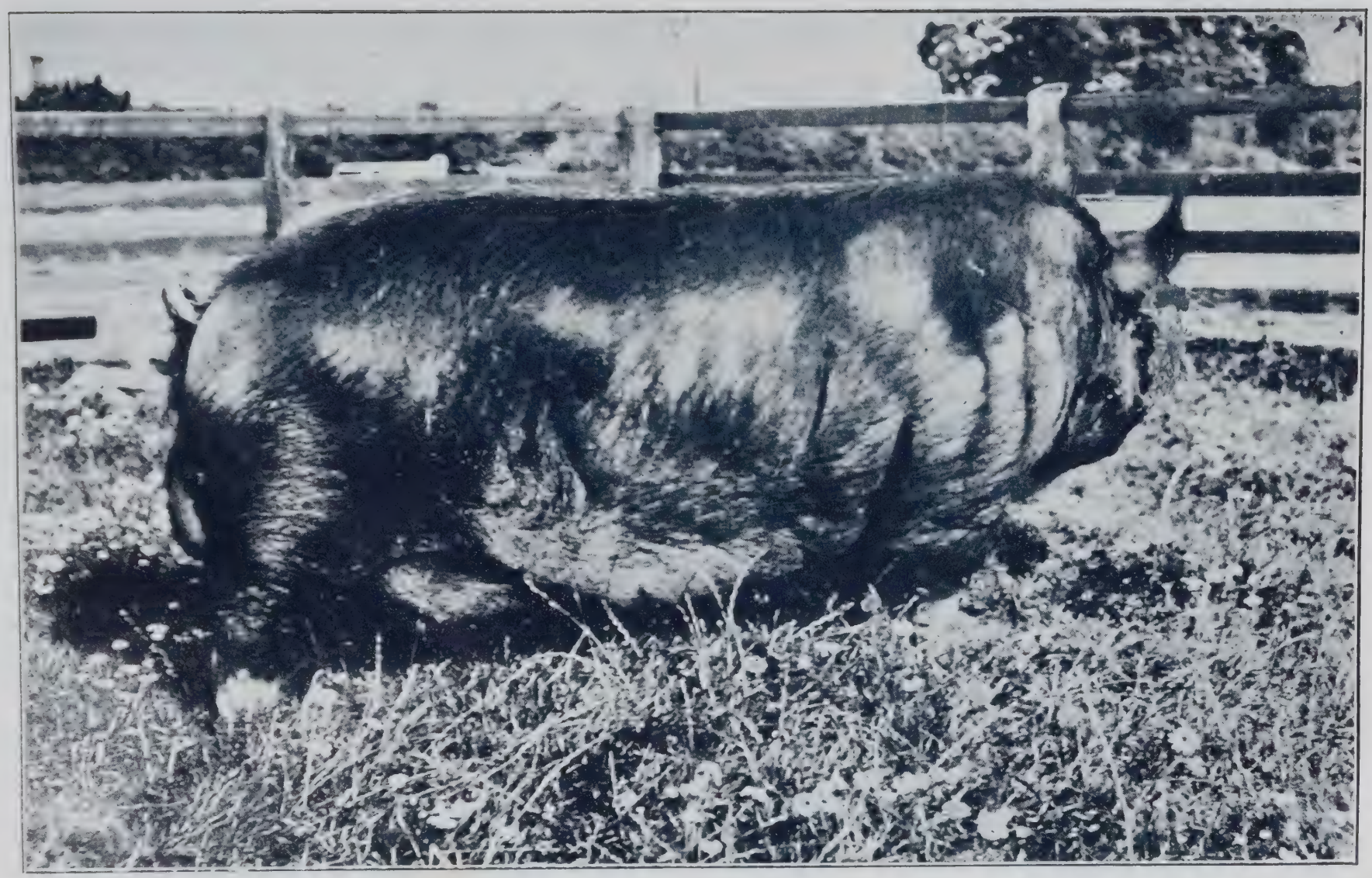
Napier Fodder Roots—Export to Union.—An arrangement has been made with the Government of the Union of South Africa under which the introduction of the roots of Napier Fodder for propagation purposes will be permitted into the Union on the condition that every consignment of such roots shall be accompanied by a certificate signed by an officer of the Rhodesian Veterinary Department to the effect that the roots have come from an area free from African Coast Fever. Any grower, therefore, who desires to send Napier Fodder roots to the Union must first procure the necessary certificate from the office of the Chief Veterinary Surgeon, Salisbury. These certificates will be issued free of charge, and it will be well for any farmer intending to export

to secure the certificate before accepting an order, for the grant or refusal of a certificate must, of course, be entirely dependent on the discretion of the Veterinary Department. Neither the Railways nor the Post Office Department will accept parcels of these roots unless accompanied by the required certificate, which should be attached to the railway consignment note or the postal despatch form, as the case may be.

Export of Pigs to the Union.—The Union Government has intimated that it is prepared to permit the importation into the Union of pigs from Rhodesia, without restriction, and the Bechuanaland Protectorate Government has consented to their passage by rail through that territory, provided they are unaccompanied by grass, hay or dry fodder. This outlet for pigs will no doubt be welcomed by farmers, particularly in the southern portion of Rhodesia, as giving them an additional outlet and an added inducement to take up pig breeding and feeding. This happy result could not have been secured but for the fact that Southern Rhodesia is happily free of infective diseases of swine. As regards markets, it will now become merely a matter of enquiry by each individual farmer, and calculation as to whether disposal of his pigs as fresh pork, or south to the markets of the Union, or to the Bacon Factory at Salisbury offers him the best profit.

Expert Information regarding Pig Rearing.—It is with pleasure that we have to intimate a generous offer of advice to farmers on matters appertaining to the breeding and feeding of pigs on the part of Mr. F. A. Walling, of Bremeridge, Gwelo, who allows us to state that he is prepared to communicate by correspondence, or otherwise, with anyone interested in this subject.

That this offer is a valuable one may be gathered when we state that Mr. Walling was for many years in charge of the piggeries of the Duchess of Devonshire, and for ten consecutive years was the biggest winner at all agricultural shows in England, as well as exporting the winners at many



Typical Berkshire Boar, "Baron Kitchener." Photograph supplied by Mr. F. A. Walling, Gwelo.

A herd of Berkshires (prize-winners), shewing sties designed by Mr. F. A. Walling.

oversea shows, taking in his time over £2,000 in prize money and cups. Mr. Walling has had particularly wide experience in pig feeding, as well as breeding, at Home, and his experience there, with the necessary modifications to suit Rhodesian conditions, should be helpful to pig men here.

We are also enabled to give illustrations of a typical Berkshire boar, "Baron Kitchener," and a herd of winners of the same breed, shewing pens and sties designed by Mr. Walling, who bred the animals shewn.

Communications should be addressed to Mr. F. A. Walling at Bremeridge, Gwelo.

The Breeding and Feeding of Pigs.—We have received a letter from a farmer in which Mr. Simmons' article in the April *Journal* on the above subject is severely criticised. We do not reproduce it because it is too long and controversial to be dealt with fully here, and also because its author hides behind a pseudonym.

His main line of argument is that "to feed pigs on marketable products is a waste of time, energy and capital." He has no word to say against the dietary of the article for pigs "as pigs," but evidently thinks its use would be unprofitable for the farmer. He gives figures intended to prove that, if pigs are fed on the scale recommended and sold at average factory weights, a dead loss will result.

The statement that it does not pay to feed pigs on marketable produce is not borne out by the experience of any other pig raising country of the world, nor, we may say, by the experience of Rhodesian breeders either. In all countries where stock raising is carried on on modern lines, it has been conclusively proved that marketable foodstuffs can be fed to stock with an increased direct profit on such foodstuffs, besides the indirect benefits to the farm which are well known and admitted. There is, however, one condition under which it does not pay to feed marketable products to stock, and that is when the market price of such products rises above a certain point, at which higher profits may be secured by direct sales on the market. This is a question that must be decided by

each farmer for himself, according to local conditions, varying in each case. The writer of the letter under consideration seems to be in the fortunate position of nearness to a railway and market, and, if he can make better prices by selling his produce than by feeding it, he would be foolish to do otherwise. Hundreds of other farmers are not so fortunately situated, and many of them are to-day raising pigs and feeding them on grain and other marketable products at a handsome profit. This Department has never advised farmers to throw away potential profits by feeding to stock products that would bring a higher price if sold direct.

The figures given by the writer of the letter in support of his argument are based on the common fallacy that feeding stuffs can be made to provide two distinct profits if sold "on the hoof." A marketable product has only one cost to the farmer, that is its first cost. It has also only one sale price, that is its final one. Therefore, it brings only one profit. It is for the farmer himself to discover whether a particular product, in a particular locality and in a particular season, will bring a higher profit by means of feeding or selling. The writer of the letter starts his calculations by charging his pigs with the sale price of all their food, forgetting that this price already includes a profit which he has made and cannot be deprived of. He wisely avoids any attempt to shew whether this profit is increased or decreased by the process of feeding. In his special circumstances it may possibly be decreased, but the contrary is true of others who have to meet heavy marketing charges on their produce.

The proper way to proceed is, first, to find the cost of producing a given foodstuff on the farm, then to discover what it will fetch if marketed in the usual way, and next to ascertain what it will realise if fed to stock and sold on the hoof after deducting the costs incidental to keeping such stock. Sale of produce through the channel of stock is only another way of realising, and personal judgment is necessary in every case to determine if it is the best one.

We may add a concrete instance of one kind of pig food, that is maize. Suppliers of the Bacon Factory, who have made their calculations on the lines we mention, and whose calculations have been tested and proved by more than a year's

steady delivery of pigs to the factory, have satisfied themselves that all maize fed to their pigs brings them a return of not less than 13s. per bag on the farm, and some place the figure higher. If our correspondent can do better, he is a lucky man.

Of course we agree with our correspondent when he says "The place and use of a pig on the farm is to turn into pork such products and waste matter in the form of food as cannot be readily sold in any other way, and then the pig is a profitable animal." But we do not agree that this is the only place for the pig or that he cannot be profitably fed on marketable produce. We do not, however, endorse the remark that "any farmer who has not a sufficiency of skim milk to give his pigs had better get rid of them and leave pigs alone," for, as the article under discussion shews, satisfactory substitutes for milk in the pig ration are known, and, better still, they are being used in Rhodesia with excellent results.

Our Journal Appreciated.—*The Rhodesia Agricultural Journal* for December, 1915, included an editorial entitled "The Social Side of Rural Life." We are pleased to note that this subject is attracting attention in Australia, and the Editor of the *Journal of Agriculture* of Victoria, writing in his issue for April, 1916, has an article under a similar heading, which is evidently based on our editorial. In fact it consists largely of a verbatim reproduction of what we wrote, with suitable modifications to meet Australian conditions. We hope that this important subject will be taken up by our local farmers, and we are glad to see that the ladies of the Lomagundi district are organising a social gathering in aid of the funds for the Sinoia Farmers' Hall. We trust this will be very successful and prove the forerunner of many similar functions.

Cement in Relation to Dip Tanks.—In this issue we reproduce an article we published in December, 1913, on the construction of cattle dipping tanks, with diagram. This has been revised in minor details. A portion of the article will be found to deal briefly with the mixing and handling of

cement required for the tank. On another page we have an article treating much more fully of the whole subject of cement, its preparation and use, and we recommend farmers thinking of building tanks to study both articles. As there is also an article on the subject of compulsory dipping and a reprint of the Compulsory Dipping Ordinance, 1914, amongst the Government Notices at the end, it is suggested that this August *Journal* should be marked as a special "dipping number" for future reference.

Tick Eradication Day.—The American State of Louisiana has appointed a day to be set apart as Tick Eradication Day, in the same way that Arbour Day is observed in some countries. The Governor has issued a proclamation naming 20th April for the celebration, and the Superintendent of Education has directed that every teacher shall devote one hour on that day to explaining the subject to his pupils. For the information of the teachers, the State Sanitary Live Stock Board has distributed 120,000 circulars, in which twelve brief reasons are given why ticks should be eradicated without delay, and it is estimated that in this way 400,000 children will learn something of the importance of the matter. It is hoped that the observation of this day will aid in the campaign now in full swing in favour of universal and systematic dipping of cattle in Louisiana. The example might be worth following.

The Shows.—This issue of the *Journal* went to press too early for us to include any account of the Salisbury Agricultural Show. We hope to have something to say about it in our next number, when we shall also deal with the poultry and citrus sections of all the shows of the season.

An Industrial League.—In the Union of South Africa an organisation has recently been initiated called the South African Industrial League. Its object is to promote the development of local industries in every direction where expansion may legitimately be looked for, in order that the

country may become more wealthy, more populous and more self-dependent. To this end efforts will be made to increase the production of raw materials (both mineral and agricultural), to exploit new sources of supply, to encourage enterprise and capital directed to the establishment of new producing industries, and to promulgate sound economic principles on lines that will foster local and British trade as a first consideration. It is not intended to make any attempt to foist on South Africa bastard industries for which the geographical position and the general conditions of the country are unsuitable. This would mean a vain and profitless competition with Home manufacturers. But there are many ways in which the wealth-making capacity of South Africa could legitimately be increased, and there are many articles which to-day are imported that might very properly be produced locally. The same arguments apply to, and the same policy may be commended to Rhodesia, and the appeal at the moment is specially strong to the farming community. Fruits, jams, soaps, fertilisers, starch products, poultry and dairy products, meats, fibres and their coarser products such as grain bags, furniture, wagons and carriages, and many other similar things might well be made in Rhodesia instead of being imported. It behoves Rhodesians to see to it that they are not found quite unprepared at the end of the war. A new trade policy is likely to inspire the Empire, and if we neglect to take line with the other colonies, we shall not reap the fruits of the great war sacrifices to which Rhodesians have contributed so worthy a share.

Compulsory Dipping.

By Eric A. Nobbs, Ph.D., B.Sc., Director of Agriculture, and J. M. Sinclair, M.R.C.V.S., Chief Veterinary Surgeon.

The efficacy of dipping cattle for the purpose of destroying ticks is now generally accepted, and the desirability of so doing is recognised both as a preventive of diseases conveyed by their agency and as a means of improving the general condition of cattle, quite apart from any question of actual disease. These facts are now regarded as axiomatic, and no longer require the proof or demonstration needed a few years ago, when farmers could only be induced by grants-in-aid from Government to erect tanks and when the enforcement of dipping regulations even around centres of active infection was regarded as a measure of very doubtful utility. These days are happily past, and the present attitude of the public mind towards the subject of dipping was first clearly indicated by the general consent accorded to the Compulsory Dipping Ordinance when it was introduced in 1914, giving power to local communities by a majority vote to enforce amongst themselves regular systematic dipping throughout a defined area. The Compulsory Dipping Ordinance of 1914 was promulgated on 24th July, 1914, and is now in active operation in areas embracing about six hundred out of the two thousand odd occupied farms in the country, including portions of the native districts of Salisbury, Mazoe, Hartley, Marandellas, Umtali and Melsetter. The groups that have requested the application of the Ordinance consist of the following numbers of farms: 213, 140, 51, 45, 42, 40, 35 and 31, shewing the latitude possible in this connection. In certain instances native reserves embraced within the areas have been included.

The sporadic outbreaks of African Coast Fever which unfortunately still occur serve as a grave reminder of the continuous need of watchfulness, and of the necessity for protective measures even where no immediate danger is apparent; and in this way compulsory general dipping may be regarded as the soundest form of live stock insurance which the farmer can undertake.

Dipping is a question of individual and local effort. Let the individual or individuals in the various districts, areas or centres adopt compulsory dipping and see that it is practised, and strenuously object to any undipped cattle coming into or through their farms or areas, and we might soon have automatic compulsory dipping throughout the country. The non-dipper and unbeliever would be compelled to dip in order to get free use for his cattle and a market for their disposal.

At the present time much attention is being given to this question, and as many are anxious to see the regular dipping of cattle much more general than it is to-day, it is thought that some details explanatory of the law and the methods of proceeding in any area to which it is desired to apply the Compulsory Dipping Ordinance will prove useful.

The procedure is very simple, and is as set forth in sections 2 and 3 of the Ordinance, which read as follows:—

"2. If the owners in any area resident in Southern Rhodesia, or in the case of non-resident owners their duly authorised representatives or agents, shall by a majority of votes request the Administrator in writing to bring compulsory dipping into operation, the Administrator may, by notice in the *Gazette*, order compulsory dipping from such date as he may prescribe within the whole or any portion of such area; and if such owners by a like majority shall request the Administrator in writing to suspend compulsory dipping within such area, the Administrator may, by notice in the *Gazette*, suspend it accordingly within the whole or any portion of such area, and for such time as he may deem fit; provided, however, that no requests as aforesaid shall be complied with until the Administrator shall have published notice of his intention to do so in the *Gazette*, and one or more news-

papers (if any) published or circulating in the said area, at least once a week for three consecutive weeks.

"Any person desiring to lodge an objection to the bringing into operation or suspension of compulsory dipping as aforesaid shall do so within six weeks of the last publication of such notice.

"3. For the purpose of the last preceding section, an owner or his duly authorised representative or agent shall have one vote in respect of an area of land not exceeding sixteen hundred morgen, and two votes in respect of an area exceeding sixteen hundred morgen."

There is no set form of petition, but the following may serve as a guide:—

Address.....

.....

District.....

Date.....

To the Director of Agriculture.

COMPULSORY DIPPING ORDINANCE, 1914.

Sir,

We, the undersigned, being residents of Southern Rhodesia, and the owners, or the duly authorised representatives or agents of the owners, of the landed property situated in the district of.....as described below, do hereby request that His Honour the Administrator may be pleased, in terms of section 2 of the Compulsory Dipping Ordinance, 1914, to put into force and apply the provisions of the said Ordinance to the under-mentioned area.

Description of Area.

That district, or that portion of the district of (as the case may be).....within the following boundaries: From the.....beacon of.....farm along the.....and.....boundaries of this farm; thence along the.....boundaries of..... farms, etc.

Signature.	Name or Description of Landed Property owned.	Area in Morgen.	Votes.

When completed, this document (in the original) should be sent to the Director of Agriculture, Salisbury. It frequently assists the movers in the matter, and also the Government, if a sketch plan of the proposed area accompanies the petition. On receipt of particulars as to the situation and extent of the area to be dealt with, a suitable map will be supplied on application to the above-named.

It should be clearly understood that no particular administrative areas, such as native or magisterial or electoral districts, need be taken in their entirety, but any group of farmers wherein the requisite majority can be found will suffice. In practice it is found that the areas defined as ox-transport areas, consisting of farms using one common centre, are very convenient for the purpose, but any area will do.

Attention may be called to the fact that dipping in terms of the Ordinance implies the use of an approved solution for the dipping of animals, and in such strength and purity as may be prescribed. Immersion in solutions not approved for the purpose does not constitute dipping in terms of the law. It has been amply demonstrated that a solution of arsenic is the cheapest and most satisfactory means of destroying ticks. No formal approval has been given to any manufactured dip, but any solution containing a proper percentage of arsenic, of which the "Laboratory" dip may be taken as the standard, will serve the requirements of the law.

Again, the intervals between dipping are fixed by the Administrator. This has been found to work well, the needs

and views of the community being met as to the frequency of dipping, and the interval changed at certain seasons or according to the extent of tick infestation.

Should the farmers in a district wish for any reason to withdraw from the operation of the law, it is competent for them to do so by the same process by which they adopted the Ordinance—a petition by the majority. No such retrograde step has yet been taken, however, in the areas to which the law has hitherto been applied.

On the first application of this Ordinance in a district, it has often happened that a number of farms are without dips, and some latitude has had to be allowed in the enforcement of dipping until arrangements could be made for the erection of tanks, or the use of tanks on some neighbouring farm. Whilst the use of a tank on an adjoining property may at first sight appear an economy, it will generally be found desirable to erect a tank on each occupied farm. Movement of entire herds of breeding stock every few days is awkward work, whilst in the case of working cattle a whole day's ploughing lost every week is a serious consideration, and if it can be avoided by the construction of a dipping tank on the farm it is an economy worth some little effort to achieve. The paying out even of a penny a head for the use of a tank is a drain on the ready-money resources. Fortunately the prime cost of a tank is no longer so considerable as it used to be, and a number have lately been built at from £60 to £90, whilst in a few instances one hears of as little as £25 sufficing for the purpose.

On the principle of helping those who endeavour to help themselves, and in view of the exceptional conditions prevailing in the country at the present time, a small amount was provided by the Legislative Council for the purpose of loans for the construction of dipping tanks within areas in which the Compulsory Dipping Ordinance has been made operative. The funds available for this purpose are limited, and it is only intended to assist those genuinely unable to find funds for the purpose in view. Land-holders who are so situated should make application to the Magistrate of their district, who will forward the same for consideration by a committee consisting of officers appointed by the Administrator to examine and

deal with these loans. Advances will be limited to actual cash outlay not exceeding £75, and, unless other adequate security is provided, the loan is registered in the Deeds Office under section 5 of Ordinance 27 of 1914, constituting a mortgage on the farm, which is effected without cost to the mortgagor. Repayment of the sum advanced, with interest at 7 per cent., will be required in equal annual instalments spread over a period of years not exceeding ten. These loans are only granted in cases of proved necessity, and are by no means available to all and sundry.

Another source of financial assistance is the Land Bank, which, it is understood, is prepared to receive applications for loans towards the erection of dipping tanks of small sums not exceeding £150 for *bona fide* farming purposes, repayable at three, six, nine or twelve months. If required, 50 per cent. only of the principal need be repaid at the expiry of twelve months, and the balance can be renewed for a further year. Such advances are only made on the security of a promissory note, signed by the borrower and countersigned by two sureties acceptable to the bank. The rate of interest chargeable is 7 per cent. per annum, payable in advance. In order to avoid delay, applicants for these small loans should submit for the bank's approval the names of the two sureties proposed, together with the names and addresses of their own and the sureties' bankers.

In connection with compulsory dipping, the suggestion is often made that public tanks would to a great extent meet the needs of the case if erected at centres where many cattle congregate or pass through, such as railway stations, public outspans and so on. To some degree such public tanks exist on the commonages of towns and villages, to serve primarily for the dipping of the cattle of residents, and secondly for the use of draught animals when they happen to come in with a load. Investigations have shewn that dipping as a preventive of African Coast Fever is of little value except where practised regularly at least once a week. A central tank where transport cattle must of necessity be dipped at irregular intervals neither prevents the introduction of infection nor its spread when introduced. It should be our constant aim to secure the multiplication of dipping tanks,

in order to reduce as far as possible the number of cattle coming regularly into contact or using the same ground. There exists a not unnatural tendency, when sending stock some distance to a tank on a neighbouring farm or to a public tank, to retain at home heavy milkers, calves, sick or poor stock and so forth, and thus vitiate the beneficial effects of general dipping. A dipping tank on each farm and rigid adherence to regular dipping of stock is the farmer's best safeguard against the introduction of Coast Fever infection, and it is also the best means of minimising the loss should infection be introduced.

The fourteen-day interval at which dipping is often carried on is much too long to have any appreciable effect in reducing the ticks which transmit African Coast Fever. The interval should be seven days for at least six months of the year. The results from weekly dipping for the six worst tick months will be much more satisfactory than fortnightly dipping for the year.

A public tank, or one owned jointly by several farmers, can at most serve stock for regular dipping only within a radius of eight or ten miles, and of those the more remote herds lose much time in travelling to and fro. Should an outbreak of infectious disease occur, the first step is general prohibition of movement, and only the stock where the tank stands can use it; those on adjacent farms are then without access to a tank at the very time it is most needed. As a general preventive of disease amongst cattle, the wise stock-owner avoids all contact with strange stock; the public dipping tank, on the contrary, entails the concentration of cattle from all quarters and their movement over the same ground, where, prior to dipping, infective ticks may be dropped and disease contracted and disseminated far and wide. For these reasons, public or central dipping tanks are not to be generally recommended, nor to be preferred to the private tank, although, as stated, they have their uses in certain cases. Where, however, as has occasionally been the case, it has been shewn that some material advantage, owing to exceptional circumstances, would be derived from a public tank, the Government has in the past granted a loan on favourable terms to a farmers' association or other approved body for the purpose, it being

a condition of the loan that the association or other body secures a suitable and central site, erects and maintains the tank, and supervises the dipping, and charges the ordinary fees to the public. In such cases money is available as soon as the tank is completed and certified in order by an official of the Veterinary Department, and on receipt of an undertaking signed, in the case of a farmers' association, by the president and secretary, to repay the amount advanced in ten annual instalments, commencing one year from the date on which the advance is made. As, however, for the reasons which have been given above, it is not, for veterinary reasons, considered advisable to encourage the construction of public or central dipping tanks in preference to private tanks, the effectiveness of which is undoubtedly far greater, such loans will only be made in cases of exceptional necessity, and will, as a general rule, carry interest at the rate of 7 per cent.

No attempt has been made in these notes to emphasise the advantages connected with the process, as it is realised that the difficulties in Rhodesia to-day are merely the practical ones of ways and means, and that the mass of public opinion is at one on the question and fully alive to the desirability of general dipping.

The provisions of the Compulsory Dipping Ordinance, 1914, will be found printed in full amongst the Government Notices at the end of this *Journal*.

Reports on Crop Experiments at the Government Farm, Gwebi,

SEASON 1915-16.

By Eric A. Nobbs, Ph.D., B.Sc., Director of Agriculture.

PART I.

The number of separate crops grown last year on the Gwebi Experiment Farm on a commercial scale—that is, on plots of several acres—was twenty, and consisted of the following, the figures being for acres:—Maize, 231½; ensilage maize, 24; buckwheat, 6; cowpeas, 17; ground nuts, 12; linseed, 3; majordas, 6; Napier fodder, 7½; potatoes, 1; sunflower, 8; teff grass, 22; wheats, 8; Boer manna, 7; castor oil, 3; dhal, 28; kaffir corn 22; mangolds, 6; oats, 34; pumpkins, 6; sweet potatoes, 3; and velvet beans, 20—making a total of 475 acres.

In addition to these, several crops were tried in a preliminary way on smaller plots, amounting to four acres in all, with a view to extension if warranted by first results. The majority of such introduction-experiments with plants of potential economic importance is carried out in the first instance at the Botanic Experiment Station at Salisbury.

The rainfall on Gwebi Farm last season was unusually light, being about ten inches under normal. This was unfavourable to comparative experiments with fertilisers—for fertilised land generally responds well to a good supply of moisture, so that the difference between treated and untreated plots would probably have been greater in a better season. All figures for weights of fertilisers and yields are to be read as "per acre." In the details of cost no account has been taken of rent or interest on land, cartage to station, cost of manage-

ment and marketing, as these are items which every farmer must calculate according to his own case. They depend on fluctuating considerations, such as original price of land, extent of crop acreage, which materially affects the charge to be placed on each acre for machinery employed, and the value put on the work of management. The unit costs of operations have been previously published in this *Journal*, and these are adhered to.

Besides the experiments dealt with below, a large series was conducted with maize, and this will form the subject of separate reports in the next issue of the *Journal*. Certain manurial experiments with maize are also separately dealt with in this number. A comprehensive experiment regarding rotation of crops, which is planned for a period covering six years, has been successfully carried through its first season, and, of course, there is nothing to be gathered from returns to date. This experiment extends to twenty-two plots of three acres each, and takes up a large proportion of the work of the year.

The Use of Artificial Fertilisers on Various Crops. —An experiment was devised to ascertain the profit to be derived from the application of artificial fertilisers to certain crops other than maize, tobacco and potatoes, for which they are now commonly used, by applying moderate dressings of complete fertilisers to oats, wheat, linseed and buckwheat. Owing to the lack of rain during the height of the growing season, the yields from the treated and untreated plots alike were low, but enough has been shewn to prove the possibility of a wider use of artificial manures than is yet practised.

Wheat.—Yellow Cross wheat is grown as a summer crop on the red soil of the Gwebi at a profit. Even in the unfavourable season of last year, some return was obtained and a notable increase secured from the addition of even so light a dressing as 30 lbs. of nitrate of soda, as the figures below will shew. Three acres were sown on land prepared as for the other experiments of this series, and the seed drilled in rows eight inches apart, at the rate of 40 lbs. per acre, on the 30th December, 1915. The crop was rolled after sprouting, and weeds hoed out on the ant-heaps, but otherwise untouched until reaped on the 4th April. There was no rust and the seed was

fairly plump, but of course the crop was very light on account of the weather, as it was grown under a total rainfall of only 22.26 inches. The effect of a top dressing of nitrate of soda was soon noticeable. The cost of operations, with the limitation above stated, was 26s. 6d. per acre, and the return on the unmanured acre was 235 lbs. grain, with 500 lbs. of straw. The application of 100 lbs. of Double Complete Safco fertiliser gave a yield of 285 lbs. grain and 500 lbs. straw, or a gain of 50 lbs. grain only. When, in addition to this general fertiliser, a top dressing of 30 lbs. nitrate of soda was given, a notable increase of yield resulted, viz., 480 lbs. grain and 625 lbs. straw. This result is in accordance with the well-known needs of wheat for a complete fertiliser rich in nitrogen, the latter applied preferably part with the seed and part subsequently. No doubt even more conclusive results would be obtained in a normal season. This experiment is a further confirmation of the possibilities of summer grown wheat in Rhodesia under suitable conditions.

Oats.—As a summer crop on red soil, grown at a cost of 26s. 5d. per acre, without fertilisers, oats yielded 540 lbs. grain and 900 lbs. straw. The addition of 100 lbs. Safco fertiliser produced little result, the increase being only 30 lbs. of grain. When, however, 30 lbs. nitrate of soda was superadded to the Safco dressing, the yield was raised to 615 lbs. grain. In each instance the amount of straw was about the same. In this case the unmanured plot was three acres in extent and those treated one acre each. The variety used was the Kherson sixty-day oat, and, owing to the demand which exists in this country for the seed, it was all allowed to ripen instead of being cut for hay, of which an excellent crop might have been secured had it been cut somewhat earlier. The land had been ploughed, rolled and disc-harrowed. The seed was grown on the farm the previous year, put in on the 22nd December, 1915, in drills 8 inches wide, at the rate of 28 lbs. per acre. Ten days later the young crop was rolled, and during March weeds were taken out by hand. The crop was cut on 12th to 14th April, and threshed, winnowed and bagged. The rainfall was deficient, amounting to 22.26 inches, of which 18.51 fell after the crop was sown, but it suffered from the long spell of dry weather in February and was short in the straw, though free from signs of rust.

Linseed.—Three acres were sown to linseed on land ploughed, rolled and disced during the winter and drag-harrowed prior to the seed being drilled in in rows 8 inches apart, using 15 lbs. seed per acre. The cost of this treatment, together with harvesting and preparing for market, was 32s. 7d. per acre. On the unmanured plot the crop was 150 lbs. seed. Where 100 lbs. Safco was employed, the yield rose to 225 lbs. seed. Where 30 lbs. nitrate of soda was used in addition to the Safco, 240 lbs. seed was reaped. These yields are of course low, as the crop was grown with the same small total rainfall recorded above.

Buckwheat.—This is a side crop which is steadily gaining in popularity, and is deserving of attention. That the trials made this year, and detailed below, would not work out financially satisfactorily is attributed to the season. Naturally a crop which matures so rapidly is particularly dependent on the rainfall during its time of growth. The buckwheat in question was sown on the 30th December and reaped on the 6th March, thus maturing in 67 days, during which it experienced a drought extending over half the time. Prior to sowing the land received 4.06 inches of rain and during the growth 15.02 inches, giving a total of 19.08 inches. The land had been ploughed, rolled and disc-harrowed in winter and drag-harrowed in preparation for the seed, which was sown with the drill in rows 8 inches apart, at the rate of 25 lbs. per acre. With this crop there is no subsequent cultivation, and only a few weeds were extracted by hand. The crop was harvested also by hand, tied in bundles, which, when dry, were threshed. A fortnight after planting there was a vast difference between the manured and unmanured plots, and when a month old the crop on the manured parts was standing 18 inches to 2 feet in height, whilst on the unmanured ground it was only about 15 inches. As stated, the yields were much below what might have been expected in ordinary years, yet a marked difference was seen between the unmanured plot, which yielded 180 lbs. only of seed per acre and about 800 lbs. of straw, against the plot which received 100 lbs. of Safco fertiliser and gave 440 lbs. of grain per acre and 1,600 lbs. of straw. Another plot received, in addition to 100 lbs. of Safco, a top dressing of 30 lbs. of nitrate of soda per acre, which latter, however, had apparently little or

no effect, as the yield resulting was only 445 lbs. of grain and 1,600 lbs. of straw. On another plot of buckwheat, three acres in extent, treated precisely similarly without fertiliser, where the costs worked out at 27s. per acre, the return was rather better than in the unfertilised plot above mentioned, viz., 316 lbs. of seed and 1,000 lbs. of straw per acre. In connection with this crop it is to be particularly noted that it occupied the land for only 67 days, and therefore it is recommended for use in circumstances where only a short part of the growing season remains available, as in the case of late ploughed lands, or land where a previous crop has failed, as often happens with maize, or where late harvested winter crops occupy the land or prevent it being prepared for another crop till well on in the season, as might happen in the case of oats, potatoes, sweet potatoes and the like.

The fertiliser used in the above described experiments, viz., Safco Double Complete Fertiliser, possessed the following guaranteed analysis:—

Phosphoric oxide soluble in water ...	20 per cent.
Phosphoric acid soluble in citrate solution, insoluble in water	1 per cent.
Total phosphoric oxide	23 per cent.
Nitrogen	8 per cent.
Potash	10 per cent.

It would appear from the results obtained with wheat and oats, and in less degree with linseed, that for these crops a fertiliser of the above composition is a valuable aid when supplemented with additional nitrogen given as a top dressing, but not otherwise; whilst in the case of buckwheat the Safco is effective, and no corresponding advantage from the extra nitrogen is shewn. These experiments, owing to the erratic season, can only be taken to indicate a general tendency, and to justify further trials on the same lines to ascertain more precisely the measure of the benefit derived from the use of artificial fertilisers to these crops. Unfortunately the manufacture of artificial fertilisers has been so upset through the war that it will be impossible next year to repeat these experiments on precisely the same lines, but the results obtained and the indications given will be followed up.

A test of nitrolin, a new form of artificial nitrogenous fertiliser, carried out in conjunction with these trials was inconclusive.

In a further series of experiments in the use of manures for such crops as sunflower, pumpkins and majordas, three acres of each were sown—one given no dressing for comparison, one given 8 tons of kraal manure, and the third 100 lbs. of fertiliser of the following composition:—

Phosphoric oxide soluble in water ...	12 per cent.
Phosphoric acid soluble in citrate solution, less phosphoric oxide soluble in water	1 per cent.
Total phosphoric oxide	15 per cent.
Nitrogen	$2\frac{1}{2}$ per cent.
Potash	$4\frac{1}{2}$ per cent.

The land throughout was of uniform character, and had all been under maize for five years in succession.

Sunflower.—Black-seeded sunflower was sown on the 13th December in drills 3 feet wide, the seed being 15 inches apart in the rows, 5 lbs. of seed being used to the acre. A few blanks were planted up later, and the crop was hoed when necessary and reaped as the heads ripened from the middle to the end of April. Owing to the incidence of the rain, the crop was not a heavy one. The plot that received nothing was throughout behind the other two. The cost of this one was 20s. $5\frac{1}{2}$d. per acre and the yield 571 lbs. of threshed seed. From the plot receiving kraal manure a return of 649 lbs. was harvested; and the one given 100 lbs. artificial fertiliser yielded 731 lbs. With the bright prospects of this crop for export, for the oil factory and for home use, farmers may be confidently recommended to make experiments on these lines themselves. The threshing of sunflower apparently presents a difficulty everywhere, and, so far as our information goes, this is conducted in a somewhat crude manner in all countries and no standard machinery for the purpose is recognised. On a large scale the power maize sheller in common use here answers the purpose admirably; but large areas under this crop are as yet the exception, and for the farmer with only a few acres of sunflower the bicycle wheel, a drum armed with

spikes, or other such makeshift, coupled with a hand winnower, will suffice. At the Gwebi Farm a worn-out Derby hand maize sheller was adapted by exposing one of the studded discs, so that the sunflower heads could be held against it. At the same time a bicycle wheel was rigged on to the spindle, and one boy turning the handle kept four others busy feeding the heads to the extemporised thresher, which on this small scale cleaned about three bags of seed per diem.

Pumpkins.—The history of the pumpkin plots is as follows. The three acres were planted on the 22nd November on hills 12 feet apart, using 1⅓ lbs. of seed of the iron bark variety to the acre. All came away well, but suffered severely from insect attacks, necessitating boys being put on to kill them. The part on which artificial fertiliser was used shewed superiority over the other plots as early as the middle of January, and continued to do so when flowering and maturing. The plot given kraal manure suffered the most from insect pests. In March the crop looked very promising as a whole, but a number of the pumpkins were stung in April and May and came to nothing, yet a fair crop resulted, and the differences due to treatment were marked. The acre which had received 100 lbs. of fertiliser gave a return of 3,200 lbs.; that receiving 8 tons of kraal manure, 2,100 lbs.; and the control plot without anything, 1,400 lbs. The costs connected with the last mentioned crop were 16s. 4d.; to the second must be added the value of the 8 tons of dung: and to that receiving artificial fertiliser 12s. 6d., for which an addition of 1,800 lbs. of pumpkins was obtained.

Majordas.—A precisely similar trial was made with majordas, and with like results in the same relative order, but the yields were very much heavier, so much so that, whatever may be the difference in nutritive value between pumpkins and majordas, this was far outweighed by the greater quantity of the crop, the main value of which is as a succulent feeding stuff for winter use. The cost of the crop was something higher than that for pumpkins, viz., £1 3s. 2d. per acre, but this was due for the most part to the extra labour involved in gathering the heavier crop and some little extra cost of cultivating it. The majordas were sown on the 19th of November and carted in at the end of June. The return for the un-

manured acre was 34,800 lbs.; for that which received 8 tons of kraal manure, 40,000 lbs.; and for that which was given 100 lbs. of Rhodesian maize fertiliser, 45,200 lbs., or 22 3-5 tons per acre. These facts also emphasise the drought-resisting qualities of this crop.

Cultivation for Ground Nuts.—The red loams are known to produce heavy crops of ground nuts, but there is some hesitancy in growing this crop owing to doubts as to ease of harvesting, and whether it is best to plant in ridges or on the flat, and, in the latter event, whether to ridge up the drills subsequently or not.

The gathering of the crop really presents no difficulties, if undertaken before the ground sets dry and hard round the pods. To this end early harvesting is advised—that is, when the leaves begin to turn yellow, although some nuts will still be unripe. A further advantage of this is that, although these late and weak pods are lost, on the other hand the sprouting of the earliest formed ones, which sometimes occurs, is avoided.

To settle the second point, as to the advantage of ridging, three plots of two acres each were planted out on the same day—the 8th December, 1915—with Spanish Bunch ground nuts on land which for six years had been continuously under maize. No manure was given, and the land had been ploughed, rolled and disc-harrowed. The drills were all alike 3 ft. wide and the nuts planted 15 in. apart in the drills, using 30 lbs. of shelled nuts per acre. Two plots were planted on the flat and the third on ridges, such as are customary for the potato crop, made with the ordinary wing-shovel plough. Of the first two, one was ridged up on the 10th of February. All were cultivated three times and hand-hoed once.

A good crop all round resulted, but the plot originally ridged for planting suffered somewhat in the dry spell, while that on the flat and not subsequently ridged always looked the best. Perhaps it is owing to the season, but the results this year are conclusively in favour of planting and cultivating on the flat, the yield being 1,200 lbs. of nuts, unshelled, or 15 bags, against 1,128 lbs., or 14 bags, on the plot planted on the flat and subsequently ridged, and only 970 lbs., just over 12

bags, from the plot planted on the ridge. In favour of the second method it may be said that it involved slightly less work than either of the other two systems.

Each plot, after the nuts were removed, yielded about 300 lbs. per acre of hay suitable for farm use.

The cost of this crop by any of the three methods was about £1 11s. 6d. per acre, or on the average of the six acres 2s. 4½d. per bag on the farm, bags not included. At 6s. 6d. per bag as the value of the nuts, adding, say, 3s. in each case for the value of the fodder harvested, the return would be for 15 bags cultivated on the flat, £5 0s. 6d. per acre; 14 bags planted on the flat and ridged later, £4 14s. per acre; 12 bags planted and cultivated on the ridge, £4 1s. per acre—in all cases a very good return on the cost of production.

In other seasons the relative advantages of planting on the flat or on ridges may vary, and the experiment is one worth repeating and worth trial by every grower of this crop on his own land.

The Width of Drills for Leguminous Crops.—A cultural experiment to determine only one point—the optimum width of drills for ground nuts, velvet beans and cow peas—was carried out on land under wheat the previous year. Only one acre of each crop was required, and the drills were spaced 24 in., 30 in., 36 in. and 42 in. apart, and the crops all grown on the flat (not ridged).

Ground Nuts.—Spanish ground nuts were planted unshelled, and the crop was grown and harvested at a cost of £1 12s. 3d. per acre. The yield was adversely affected by depredations of hares and crows and by lack of rain, and it may be mentioned that other plots near by, planted only a few days earlier, but which got the benefit of the last of the early rains, yielded crops of more than double. The results are, however, not without interest, close planting not being justified. The returns are:—

Drills 24 in. apart yielded 260 lbs. per acre.
Drills 30 in. apart yielded 404 lbs. per acre.
Drills 36 in. apart yielded 520 lbs. per acre.
Drills 42 in. apart yielded 480 lbs. per acre.

Cow Peas.—The cow pea crop, though again too poor to rank as a commercial success or to give conclusive results, was on this good soil very much better than in other trials this year.

Velvet Beans.—In this case the width of the drills in four plots was respectively 24 in., 30 in., 36 in. and 42 in., the seed being sown uniformly 15 in. apart in the drills. The land had been under summer wheat the previous year and the crop was sown on the 16th December, and subsequently horse-hoed once and hand-hoed once. The cost of the experimental operations was £2 5s. 6d. per acre, of which 13s. 6d. is set down for reaping and 17s. 6d. for baling hay and threshing, winnowing and bagging the seed. The average crop on the four plots was 1,655 lbs. of hay of excellent quality and 319 lbs. of seed. The crop looked well all through, except that in April beetles (*Mylabris articulata* and others) did some damage at the flowering stage. The close-planted drills were obviously worse than the others owing to congestion, whilst the widest drills were also found to be less profitable than the medium width, as shewn by the following results:—

Drills 24 in. apart yielded 1,600 lbs. of hay and 200 lbs. of seed per acre.

Drills 30 in. apart yielded 1,720 lbs. of hay and 384 lbs. of seed per acre.

Drills 36 in. apart yielded 1,900 lbs. of hay and 372 lbs. of seed per acre.

Drills 42 in. apart yielded 1,400 lbs. of hay and 320 lbs. of seed per acre.

Harvesting Velvet Beans.—In connection with the harvesting of velvet beans in the above experiments, a method was devised by the manager which deserves to be widely known and adopted on account of its material practical advantages. Anyone who has grown velvet beans must have realised the difficulty of harvesting owing to the irritation caused by the black hairs on the stalks and pods, which sting the hands and arms of the workers, particularly of boys picking the ripe pods. Another drawback has been the loss of leaves in gathering the ripe pods and the woody character of the stalks of the runners. To obviate these faults and make the best hay, the crop on the Gwebi Farm this year was cut about 6 or 8 in.

above ground, leaving the bunch of pods round the base (the main crop), when these were well formed, but the remainder on the runners were just set or still only flowers. The vines or tops were gathered in small cocks to dry, and later on carted in during the night or very early morning and baled before they were brittle, dry and hard, thus saving much loss of leaf. The bunch of stalks and pods with a few leaves, without all the covering of foliage, were easily dealt with when the beans ripened. What may have been lost in beans was made up for in the greatly superior hay won and in the ease of harvesting of both hay and bean crops. The former was cut in the first week of May, the latter gathered in the third week of June.

A patch of velvet beans was divided in two, the one portion being dealt with as described above, the other allowed to ripen in the usual way and the beans and hay harvested simultaneously, the beans being hand-picked from the entire crop. From the former plot were harvested 210 lbs. of beans and 1,220 lbs. of excellent velvet bean hay; from the latter, 410 lbs. of beans and no hay, as the leaves were hard, dry and shrivelled, and only wood stalks remained after the beans were gathered.

This is the first time that this method of harvesting has been tried, and these comparisons are derived from only one plot, but it is evident that the new plan allows both of a hay crop being secured and a good supply of seed obtained, as well as overcoming the great objections to picking the pods off the runners. This plan is, therefore, from a practical point of view a great advantage.

Crop Trials.—The various crops mentioned below are grown mainly to ascertain from year to year their yield and profitableness or otherwise, to arrive at reliable data as to the possibilities of such crops in the portions of Rhodesia of which the Gwebi Farm is representative, and to ascertain the suitability of such crops in rotation or as side crops.

Napier's Fodder.—This valuable native plant is now well established in the public favour, and only needs to be better known to be still more extensively grown. Slips to the number of 71,000 were sold by the Department of Agriculture last

season, and a few farmers are also now in a position to sell slips. For the coming season the price will be reduced to £1 per 1,000, f.o.r., cash with order. The acreage on the Gwebi Farm has been extended, and further large plantings are intended. Owing to the unfavourable rains a large proportion of slips died last year and growth of the rest was retarded. Part was intended for silage and part for grazing, but the whole has been used in the last-mentioned way and is devoured with evident relish by the cattle during the winter.

Cow Cane, Indian Cane and M'fufu.—With a view to the extension of our green winter fodder plants, three new introductions, somewhat similar in habit of growth to Napier's fodder, were tried on a small scale. These are cow cane, Indian cane and m'fufu grass, the first two of which were introduced by the Director of Agriculture as a result of his visit to Australia. Only limited quantities are as yet available for experimental extension work, and none is likely to be available for distribution to the public for a year or two. M'fufu grass, on the contrary, is a native of Rhodesia, and is often mistaken for Napier's fodder.

Neither cow cane nor Indian cane makes such luxuriant growth as Napier's fodder, but both appear to withstand frost very much better, and to remain untouched alongside of Napier's fodder that is completely cut down and withered. Cow cane has an erect habit of growth, and forms dense, erect stools 6 to 8 ft. high, whilst Indian cane has thicker, juicy stems, and inclines to be more spreading. To compare these fairly with Napier's fodder, continued observation of the plots growing side by side is desirable for some seasons yet.

An Ensilage Mixture.—Actual figures regarding quantities and cost of production of ensilage are difficult to obtain, so that the following particulars are likely to be read with especial interest. Maize constituted the main element of the silage, but cow peas were grown between the rows of maize with the joint objects of raising the nutrient value of the fodder, making the utmost use of the land, and enriching it by means of a leguminous crop. The resulting article, considerably superior to ordinary maize silage, cost about 5s. per ton, and though not directly marketable, is worth very much more than that for the live stock on the farm during winter.

The land chosen was a piece 24 acres in extent, of only moderate fertility, and had been once ploughed and drag-harrowed prior to the planting of Hickory King maize in drills 40 in. apart at the rate 15 lbs. seed per acre, or only slightly thicker than normal. Maize for silage need not be sown as early as the main crop, and this was only put in on 20th January, followed by cow peas midway between the rows, put in with the maize planter at the rate of 8 lbs. to the acre. The young maize was once harrowed just before the cow peas were sown, and the land hand-hoed in the middle of February, as cultivation by animal power was, of course, impossible. The crop on one-tenth of an acre was carefully weighed and the remainder estimated therefrom. Owing to the drought the cow peas did less well than in a normal season, but there was a heavy crop of green maize, and the whole was converted into silage at the end of April, at a cost of 19s. 11d. per acre, say 5s. per ton, made up as follows, on the 24 acres:—

Disc-ploughing	£2	8	0
Drag-harrowing	0	18	0
360 lbs. maize	0	18	0
192 lbs. cow peas	1	2	0
Sowing	1	16	0
Harrowing	0	12	0
Hand-hoeing	4	4	0
Reaping	1	4	0
Carting	4	16	0
Chaffing and packing into silo pit ...	6	0	0
	£23	18	0

or 19s. 11d. per acre.

Artificial Pastures.—The need and advantages of creating permanent pasture out of old lands are apparent to all, and the possibility of establishing such artificial grazing is often discussed. The problem is not an easy one of solution in a country where during the growing season natural pasturage is so abundant and during the winter the climate is so dry that vegetative activity must cease and the temperature on occasions is so low that most green things are cut down. The chief desiderata of artificial pasturage, therefore, must be that it may grow longer into the dry season, or sprout

earlier than does the native herbage, and that in the dead season it will remain more nutritive and more palatable than does the veld. These are difficult requirements to fulfil, and many experiments in this direction have proved unsuccessful. The habits, character and requirements of all possible exotic and indigenous grasses and pasture plants have to be investigated, and such as give promise must be confirmed by several years' trial. Thereafter combinations of these have to be tested. After years of preliminary work at the Botanical Experiment Station at Salisbury, several such plants have achieved sufficient promise to justify their trial on a larger scale at the Gwebi Farm, and next year several further introductions are looked for.

Of those under trial last year, goat's rue and sheep's parsley, which did well on a previous trial, failed to germinate last season owing to defective seed. Tall fescue was a complete failure. Australian blue grass failed to make good. Beggar weed, though not a heavy cropper, came through the severe test of winter very well, and is likely to occupy a useful position in a mixture along with certain grasses.

Guinea Grass (*Panicum maximum*) is one of those which, from preliminary experiments at Salisbury, appeared to warrant more extended trial, and to this end slips were put in 3 ft. square on 10th January. These struck well in spite of adverse weather, and were in flower in April. The June frosts cut down the plants, but they are expected to survive the winter and re-start early with the return of warmer weather. On the particular soil in question, closer planting is indicated as desirable, but this grass will in time to come probably be chiefly grown from seed. On better soil wide planting is probably to be recommended.

Sudan Grass (*Andropogon sp.*) also gives great promise. Sown on the 8th January at the rate of 10 lbs. per acre, this strong, erect, leafy grass grew vigorously and attained a height of 6 ft. to 7 ft. before seeding, and on this first trial yielded 2,800 lbs. of hay, or rather straw, for it was all allowed to ripen so as to provide seed, which is as yet very difficult to procure. Judging from this trial, Sudan grass seems likely to furnish a hay crop outrivalling Boer manna or teff, whilst it withstands cold and recovers from the effects of

frost in a remarkable degree, and was reported during June (1916) to be quite green and to have begun re-growth within three weeks after being checked by the frost. It is also very suitable for grazing. Cattle appear to relish Sudan grass. This was proved by mixing some of the threshed straw with good veld hay. The cattle were seen to nose through the veld hay to pick out the Sudan grass hay from amongst it. It will be some time before seed of this excellent grass can be obtained in quantity for distribution, and meantime further experiment will be made to ascertain the best mode of growing and utilising this valuable discovery.

Molasses Grass (*Melinis minutiflora*) is another possible hay and pasture plant of great promise, of which as yet the seed is even more scarce, but which has given such promise as to deserve mention here, and careful propagation and extension until enough seed for general use can be obtained. It is entirely different in habit of growth—dense, matted and spreading, and apparently somewhat readily cut down by frost, but recovering rapidly and continuing growth during winter in a remarkable manner. The frosted grass also remains quite palatable. The future of this grass will be carefully watched.

During the coming season further experiments with these grasses and certain other possible pasture plants will be extended.

The Agricultural Shows.

Up to the time of writing the produce exhibited at the agricultural shows this season has generally been small in quantity and only moderate in quality. This, of course, was only to be expected in a year broken at the height of the growing season by over a month's drought. One very important improvement has, however, been noticeable, namely, the increasing ability of the farmers to select and prepare exhibits for the shows. In the case of maize, both cobs and grain are chosen with far greater discrimination and uniformity than in past years. With other grains also a much higher standard is reached than has been the case in the near past. In the case of fodder crops, these are being prepared in a better manner and are cut at the period when the plant has attained its maximum food value. The standard thus set at the shows is undoubtedly of high educative value to the farmer and is a means of shewing to the commercial world what the potential possibilities of a given district are.

THE BULAWAYO SHOW.

Produce and General.—A pleasing exception to the general sparseness of produce exhibits this season deserves notice, indicating as it does the trend of arable farming in Matabeleland towards the production of fodder crops to be consumed on the farm. The class for a collection of Rhodesian produce, not less than six different kinds, brought out good and instructive exhibits. The first prize collection, made by Mr. Bradshaw, of the Trevelloe Estate, Shangani, consisted of bales of fodder and sheaves or bundles of maize stalks and Napier's fodder, velvet bean, teff, linseed, millet, dhal and veld grass hay; also bags of Hickory King and Horsetooth maize, common beans of four sorts, velvet beans, dhal, linseed

and linseed chaff, peas, sunflower, buckwheat, ground-nuts, white and red Texas kaffir corn, potatoes, majordas and pumpkins. All these crops were raised during the past season under a very short rainfall without irrigation, and shew what can be done under even unfavourable circumstances. The second prize collection, shewn by Mr. Laing, of Figtree, was also very creditable, containing certain exhibits not shewn in the first, such as inyouti, rapoko, broom corn, cow peas, several other beans and peas, roselle, hibiscus and Mauritius hemp fibre, all grown with only seventeen inches of rain.

Generally speaking, the forage classes shewed a marked improvement, dry and over-ripe hay being practically absent, while a number of leguminous hays, such as dhal, pea-nut, velvet bean and lucerne, were shewn. Roots, pumpkins and melons were surprisingly good for the season, and these are crops that can well be encouraged in Matabeleland, doing well under the severe conditions so frequently obtaining there. Mr. Peel, Mr. Goodwin and Mr. White are to be congratulated on their exhibits in this section.

The premier honours in the maize have again gone to Messrs. H. P. Holl and Laing Bros., who have now consistently exhibited for many years. The seed maize shewn was quite good, although it was impossible to shew equally good cobs in a season like the last. In most of the other cereal classes the quality was fair only, with very little competition, Mr. T. E. Bolitho easily taking most of the prizes.

Industrial exhibits included South African blankets, vehicles, tobacco, Rhodesian furniture, cement, bacon, oil, soap, cheese and woodwork, including exceedingly creditable models made by the boys of the Milton School, Bulawayo.

Implements were conspicuous by their absence, the various firms usually exhibiting having determined, in consequence of war conditions, not to shew this year, a decision which, however discreet, is none the less to be regretted.

Live Stock.—While all classes of stock were highly creditable to their owners and to the country, it will be generally agreed that the Shorthorn classes were the outstanding feature of the show. It is perhaps not too much to say that

Mr. Drummond Forbes' "Lomond." Winner of Thousand Guinea Trophy, 1916.

the senior bull class would have passed muster anywhere in the old country, and when one takes into consideration our own conditions, they give cause for the greatest optimism in regard to the future of our cattle industry.

With one or two exceptions (principally in the pig classes), the excellent condition in which the animals were presented was most noticeable. Not only was the condition of winners good, but generally speaking the whole of each class was good, and did not consist (as has so often been the case in past years) of a few good animals, tailing off to a number of indifferent specimens.

What may now be considered the blue ribbon of the Rhodesian cattle industry, the Thousand Guinea Trophy, was won for the second time by Mr. Drummond Forbes' beautiful beef Shorthorn bull "Lomond," by "Birdsall Cicero," *ex* "Richmond Lass," bred in the Free State by Messrs. Anderson Bros. This bull, now three-and-a-half years old, has come on wonderfully since last year, and is a grand example of the early maturing beef type, square from every point of view, fleshy yet active and full of quality. He reflected the greatest credit on both his breeders and his owner, in whose care he has been for the last two years. The runner-up was Mr. G. C. Woodforde's Shorthorn bull "Prince Worcester," which last year was placed third to "Lomond" and Mr. E. H. T. Mitchell's "Aldsworth Bard." "Prince Worcester" is four years old, and was bred in England by Mr. J. Horlick. He is by "Adbolton Prince," out of "Duchess of Barrington 84th." He represents very aristocratic dairy Shorthorn blood, with one cross of Cruickshank blood on the top of his pedigree. He is full of stamina and constitution, and is calculated to produce what the old Bates people aimed at, namely, an animal giving as much milk as is consistent with a reasonably good carcase.

In the junior open Shorthorn classes, Mr. George Fath's "Belsington Imperieuse" beat Mr. E. H. T. Mitchell's "Aldsworth Bard," and Messrs. James & Worthington's "Cameron Balnakyle." "Lomond" beat Mr. E. A. Hull's Red Lincoln bull "Westacre Knut" in the senior S.A. class, the latter selling for £120 on the sale the next day. "Cameron Balnakyle" was victorious over Mr. Woodforde's "Lanteglos

Advocate" and a number of other excellent bulls in the junior S.A. class. "Belsington Imperieuse" comes, as his name implies, from the Belsington Priory herd, and is of mixed dairy and beef breeding; a very beautiful young bull, and one which, when he has had time to acclimatise and to get into condition, is likely to make a mark. "Cameron Balnakyle," recently imported from the Free State by his owners, is bred by the breeders of the trophy winner, is pure beef type and a bull to be taken note of. "Lanteglos Advocate" is a worthy son of "Prince Worcester," and was sold for something over 70 guineas. Mr. E. A. Hull's "Westacre Buccaneer" and Messrs. Roberts & Letts' "Thornbury Bampton" are excellent bulls, notwithstanding the fact that they failed to secure more than third and fourth places. In the Shorthorn female classes, the B.S.A. Co.'s Shangani Estate, Messrs. E. A. Hull, F. E. Woods and George Fath provided the winners. Messrs. Freeze & Cann exhibited two heifers from the Belsington Priory herd, which were afterwards sold to Mr. Drummond Forbes for £300, to mate wi "Lomond." Although we could do with many more, there is no doubt that we have a number of first-class cows in the country.

Next to the Shorthorns, the Herefords, though not strong in numbers, attracted much attention, and did their owners and their breed much credit. In the open senior class "Devonby Dreadnought," the trophy winner of 1914, beat Mr. Jack Mack's good old bull "Peerless." Mr. Jobling sold "Devonby Dreadnought" for £250 to Mr. Bernstein to go to Mashonaland. In the junior open class Mr. Jobling's "Devonby Democrat" took precedence of two good bulls imported by Messrs. Cooper & Nephews, "St. George" and "Bugler." "Devonby Democrat," bred by his owner, is by "Banana" out of "Hazel Star," and therefore own brother to "Devonby Dreadnought." He is now 14 months old, and remains at Devonby. "St. George" remains with his owners at Sandown, while Mr. Duncan Black, of Salisbury, has acquired "Bugler" for £190. The Hereford female classes were strong, nevertheless Mr. Jobling managed to beat all imported stock with his Rhodesian-bred "Devonby Dryad." Messrs. Cooper & Nephews, George Mitchell and R. Granger supplied other winners.

Mr. Jobling's "Devonby Dreadnought." Hereford. Winner of Thousand Guinea Trophy, 1914.

Frieslands were a much weaker class than usual. Messrs. H. P. Fynn and H. Clarke divided the bull honours, except in the junior S.A. class, in which Mr. W. F. White came off best. Messrs. Freeze & Cann and Mr. H. Clarke were the fortunate ones in the female classes.

We were glad to see a number of good Aberdeen Angus females, owned by Messrs. F. E. Woods, J. R. Stewart and J. Champion, while there were also one or two bulls, notably Mr. F. E. Woods' "Encore of Hensley," a bull of considerable merit.

Africanders, the property of Messrs. H. P. Fynn, C. Montgomery, H. T. Fynn, H. S. Bawden and the Mashonaland Agency, were in strong force. Mr. H. T. Fynn secured the award in both the senior and junior bull classes and the junior female classes, while the Mashonaland Agency were successful amongst the senior cows.

North Devons were fairly well represented, and a number of very good bulls were in evidence. Messrs. Coles and McKenzie's "Pound Crisis," Mr. H. S. Langdon's "Manor Bright Eyes" and Messrs. Austin & Good's "Manor Goldfish" and "Manor Courtier II." were the winners in the various classes. Mr. A. H. Mitchell, of Bulawayo, and Mr. Peach, of Figtree, also shewed some very good bulls. De Beers' Shangani Estate secured all the female honours against Messrs. Austin & Good and Mr. W. F. White. Devon bulls realised from £40 to £60 on the subsequent sale.

South Devons were exhibited by Major W. E. T. Bolitho, Messrs. J. P. Carlisle, W. V. Fleming, Austin & Good and H. P. Fynn. Messrs. Fynn, Fleming and Austin & Good were chiefly successful in the bull classes. Major Bolitho was the only exhibitor in the female classes, but shewed some excellent animals.

In the Sussex ranks De Beers' Shangani Estate were the only exhibitors, having four bulls and four cows on the show, of good quality.

Ayrshires were not numerous, and were represented by two bulls and three females.

Quite a number of good-looking dairy cows in milk competed in classes for dairy points, milk yield and butter yield.

A feature of the show, which was of special interest in view of the lately opened up beef trade in Johannesburg, was the grade beef classes. Several fine specimens of grade Shorthorn and Aberdeen Angus bullocks were shewn of a quality that left little doubt that by breeding and feeding we can produce a carcase in Rhodesia that will command, if not the best, at least a first-class trade. Mr. Hull's fine Shorthorn went back to be further fed and exhibited at Johannesburg in September. A great Shorthorn steer, fed by Mr. H. P. Fynn, fetched £26 on the sale, and subsequently killed out 890 lbs. dressed weight. A particularly fine pen of grade Aberdeen Angus bullocks, bred and fed by Mr. F. E. Woods, also went back home to await the Johannesburg show.

The entries in the sheep classes, as elsewhere in Rhodesia at present, were not numerous, but the quality of the exhibits was distinctly good. Mr. F. D. Walker shewed some woolled Persians and half-bred woolled Persians, which were a great recommendation for the breed in his district near Bulawayo, and led one to think that perhaps this breed has not received as much attention as it deserves in other districts. They all possessed great weight, with a good fleece of very saleable wool. Next to the woolled, the non-woolled Persians were most in evidence, the principal awards going to Mr. A. G. Hay. Mr. O. L. Edwards, of Daisyfield, was the only exhibitor of Merinos, and Mr. R. A. Fletcher provided the only slaughter sheep.

With the exception of the class for Boer goat rams, of which there was a fair entry, the goat section was chiefly confined to cross-bred and pure milch goats, Mrs. G. Rooke, Mr. M. Maguire and Mrs. R. A. Fletcher being the principal exhibitors of these.

The pig classes were well filled, and some quite excellent pigs were shewn, particularly Yorkshires and Berkshires, and a few pens of slaughter pigs. Some of the exhibits in the boar classes were lamentably lacking in condition and preparation for show. We would remind their owners that the value of shewing lies in the advertisement of one's herd, and therefore

Mr. Jobling's "Devonby Democrat." Champion Hereford bull, Bulawayo Show, 1916.

animals shewn in bad condition not only stand very little chance of notice from the judge, but actually tend to disparage the herd and destroy any subsequent chances of doing business. Mr. E. A. Hull was the only exhibitor of Yorkshires, while Messrs. H. Squair, S. F. Townsend, G. W. V. Knight, R. A. Fletcher and Mrs. K. H. Molyneux provided the winners in the Berkshire classes. Messrs. H. Squair and R. A. Fletcher shewed one or two good Large Blacks, while Mr. E. A. Hull and Miss Sky won in the slaughter pig classes with exhibits of good quality.

The conditions of this country at present make it impossible for the horse classes at our shows to attract the same amount of attention from business men as the cattle, but some 70 odd stud animals and foals were submitted to the judges, exclusive of what are known as ring events. Two fine thoroughbred stallions competed, namely, the B.S.A. Co.'s "Conjuror," by "Kingfield" *ex* "Jugglery," and Mr. E. A. Hull's "Aldershot," by "Conroy." There were also five Pony or Galloway stallions, of which Mr. J. B. McNeill's "Diavolo" and Mr. H. Hall's "Blackie" were adjudged the best. The balance were brood mares and young stock.

THE GWELO SHOW.

This show, which up to the last moment had promised so well, proved a great disappointment, owing to the natural disinclination of exhibitors of cattle to send in their entries in view of the unfortunate and inexplicable outbreak of African Coast fever at Hunter's Road. Not only were the cattle sections almost empty, but other classes suffered in consequence, and the attendance was much less than would otherwise have been the case. This is the more to be regretted in that this was the only agricultural show which it was possible for H.E. the High Commissioner to attend.

In his speech formally opening the show, His Excellency referred to the importance of Gwelo as an agricultural centre, and expressed regret at the unfortunate drawbacks under which the show was being held, particularly the outbreak of African Coast fever in the district. He went on to say that

the district was immediately interested in cattle and ranching, and remarked on the fact that the Administrator had been able to come to an agreement with the Union Government for the export for slaughter purposes of a thousand head of cattle per month to Johannesburg. He spoke appreciatively of the Creamery and its advantages to farmers generally. Commenting on the value of winter feeding for stock, he remarked on the hay ricks he had seen near Gwelo. He had seen very few in the country, but thought special attention should be paid to gathering food for winter use. One thing he wished to say was that after the war the prices of agricultural products would remain high for a considerable time. It was also pretty certain that there would be a good deal of emigration from Great Britain after the war into the Union and probably into Rhodesia, and he was sure we should welcome such emigration if the emigrants were of a suitable class.

In spite of all drawbacks, the improvement in the selection and preparation of the produce exhibits was very evident, and the Hickory King mealies shewn by Mr. Bradley were easily the best of their kind. A collection of farm products staged by Mr. P. T. Webb, of Iron Mine Hill, was an extremely well prepared and comprehensive exhibit, illustrative of the varied activities and possibilities of a single farm. This collection would have been a credit to a whole district, and Mr. Webb is to be congratulated on introducing a feature which is almost new in Rhodesian shows.

For reasons already referred to, the cattle sections were practically empty, with the exception of the Bulawayo exhibits of Messrs. Woodforde and Mack. Therefore criticisms of these classes would be both unfair and valueless.

We were somewhat disappointed not to see larger competition in the Merino sheep classes, as Gwelo is the one district in Rhodesia in which this class of stock is making some headway, but no doubt the difficulty in regard to the cattle affected the numbers of all kinds of stock on the show.

A few good pigs were shewn, notably some Tamworths exhibited by Mr. Cousins, and a very good Berkshire sow, the property of Mr. Knight, of Gatooma.

THE HARTLEY SHOW.

As we expected, the produce sections at this show were noteworthy both as to the variety and the quality of the exhibits, and reflected great credit on the farmers of the district in this their second annual show.

The hay classes deserve special mention, as the products almost without exception shewed the improved care which is taken to cut and cure hay at the right period. The entries in the maize classes were numerous and generally of good quality, and the kaffir corn shewn by Messrs. Sworder Bros. was a very fine example of the sapling variety that they have made their speciality. The award for the highest aggregate of first prizes in the produce section was won by Mr. C. S. Marks, who very creditably competed in almost every class.

The various other classes for produce were also well filled, notably ground-nuts with ten entries and teff hay with nine, whilst interesting exhibits were on view of castor oil, sunflower, cassava root and meal, artichokes and Klein Koren wheat, all of good quality.

Another pleasing feature of this show was the excellence of the citrus exhibits, which for quality would be hard to beat in Rhodesia, the entries by Messrs. Sworder Bros., Cutler, the B.S.A. Co.'s Citrus Estate, Mazoe, and the collection shewn by Messrs. Knight & Folkestad being particularly worthy of praise.

The Society is to be complimented on adding materially to the interest of the show by arranging a steam ploughing demonstration by Mr. Woodforde, of Lanteglos; a dehorning demonstration by Mr. Wood, of Shangani; an inspanning and outspanning competition; and a lecture on maize judging by Mr. Walters, of the Department of Agriculture, which was very well attended and followed with much interest.

The cattle shewn, although not numerous, included some very first-class specimens, and gave every indication of a very healthy and pleasing tendency on the part of mine owners in the district to invest money in really good stock. Mr. Woodforde brought on his stock from Bulawayo and Gwelo, and a

few heifers and cows in addition. Mr. Mack's Hereford bull "Peerless" and a couple of Hereford heifers were shewn. Mr. C. E. Simpson also had a useful Shorthorn bull, "K.C.B." With animals of this class, it was only to be expected that they should secure the prizes in their respective breeds. Mr. Woodforde also carried off the awards for the champion bull and champion cow on the show. The Frieslands were a fairly strong class, though some of them might have been given more preparation for show. A few good grade milch cows were shewn, amongst which was one particularly good-looking animal, the property of Mr. J. Hannaford.

Sheep and goats were poorly represented, but pigs, on the other hand, were quite a strong class, and the best show perhaps that we have yet seen in Rhodesia, especially from a bacon factory point of view.

District shows, such as this, must necessarily be small, but when one finds local men shewing really first-class animals, and their neighbours trying their best to emulate them, one can only feel that real progress is being made, and that the district generally is making good headway towards greater things.

THE VICTORIA SHOW.

Victoria scored an undoubted success by its show, which demonstrated most unmistakably the potentialities of that fertile though sparsely peopled district. It is only two years since the first agricultural show was held here, but already there is good evidence of considerable progress in the cattle breeding methods of the district. The show ground is unique in being delightfully situated under great shady trees, in being without a fence and without a gate in both senses of the term. The cattle pens, placed under the trees, were well filled, the entries numbering some 150 head. Victoria is renowned for its native cattle, yet the most striking feature of the show consisted of grade stock, particularly the heifers of one, two and three years old, of which fifty-one in pens of three faced the judges. It was a collection of beautiful, well-formed, well-fed animals, shewing extraordinarily rapid maturity and

Mr. Jobling's "Devonby Dryad," two-year-old heifer. Winner, best female on Bulawayo Show, 1916.

the bloom of good health, a testimony to the interest of the breeders and the excellence of the pasture, as well as a criterion by which to judge the possibility of improvement due to modern Rhodesian ranching methods. It was satisfactory also to be able to assure oneself, during the few days following the show, that these exhibits were not merely chance good specimens, but *bona fide* samples of similar heifers in bulk. In this district, where ranching prevails, Hereford, Devon and Sussex crosses seem more popular than Shorthorns; yet it is to be noted that the champion bull was Mr. Richard's Shorthorn, and that, of the three classes for heifers, two first-prize winners were Messrs. Chambers & Plant and Mr. Halliday, with Shorthorns, the third going to Mr. Fitzgerald with Herefords; whilst the first-named, with their yearlings, beat the prize-winners of the older classes when all three groups were brought together for a championship.

A class was wisely provided for grade bulls, for it is recognised that pure-bred bulls are unobtainable in adequate numbers, and the use of grade sires is forced upon the farmers. In this class there were ten entries, the first and second prizes being taken by Herefords, the first a grand young bull bred by Mr. Evans and owned by Messrs. Jones Bros., whilst the high merit justified a commendation being given to a Sussex grade bull bred by Mr. Forrestall at Chibi. Some of the grade bulls were somewhat plain or even deficient, and it should be remembered by farmers using cross-bred stock that in such cases it is more than ever important that the sire should at least be sound and without serious defect, as his power of transferring to the offspring his good characteristics is much less than that of a pure-bred bull, and in his stock out of native cows the common blood necessarily preponderates.

Bulls of the different breeds favoured in the district were shewn in good numbers, especially Herefords and Devons. We should like to have seen their stud cattle shewn in rather better condition, both from the point of view of the show and the utility of the animals to their owners, but no doubt these things will come in time.

A few excellent milch cows were exhibited by Mr. James

Struthers and Messrs. Chambers & Plant, but the bulk of the animals were of beef breeds.

Very few pigs or sheep were shewn, and horses, with the exception of two or three good brood mares and foals, were not a strong class. Horse-sickness, so long as it remains uncontrollable, must militate against any great expansion of the horse breeding industry; and when we remember that some of the stock of all classes on this show had been brought over 100 miles by road, we must congratulate the Victoria farmers on their energy and public spirit. At the same time, it is to be regretted that several of the large, well-known stock-raisers in the district were not represented on the show.

Compared to stock, all other items at Victoria were of secondary importance, the severe drought of last season having materially diminished crops of all kinds. The maize classes were easily the best of the produce sections, and the cobs exhibited by Messrs. MacIntosh Bros. would render a good account of themselves at any show in the Territory.

THE RUSAPE SHOW.

The farmers of the Makoni district are to be warmly congratulated on the success of their first district show, which demonstrated in a remarkable manner the potentialities of that fertile and favoured part of the country. Intended primarily for that purpose, it proved also a meeting of educational value to all who saw the variety and quality of the exhibits tabled, and enabled the Farmers' Association concerned to prepare a creditable collection for further exhibition at Umtali and Salisbury shows.

In the produce sections maize, potatoes and hay deserve special mention on account of their excellence. Mr. Lloyd took premier honours in the maize classes, while Mr. Lyle won in most of the potato classes against very severe competition.

The absence of all stock naturally took away much from the interest, but it is hoped that this omission may be rectified

next year, in which case there is every prospect of the Rusape show becoming an annual gathering of importance, benefiting not only the local community, but also assuring the larger shows of valuable entries both by individuals and by the Association as representing the district. Such small shows are, therefore, helpful to the larger ones, and deserve to be encouraged both on that account and because they add such a pleasant and instructive feature to the social life of our all too thinly populated country districts. The promoters of this gathering, more particularly Messrs. Harnden, Pope and Stuart, are to be congratulated on the results of their effort.

THE UMTALI SHOW.

Produce and General.—Umtali show was held on the Society's most picturesquely situated show ground, and was well supported by the local farmers and public. The effects of the past unfavourable season were seen in the produce section, where the classes were not as well filled as has been the case in other years, but the quality was quite up to the usual high level, and in spite of adverse circumstances a distinct improvement was apparent in most classes. This improvement has been evident and progressive for some years, and in some of the classes a very high standard has been reached. This is true particularly of the maize classes, where the exhibits this season probably constitute a record for Rhodesia in point of quality. By dint of continuous selection on the part of some of the principal growers a type of maize has been evolved which is particularly deep in the grain and uniform in appearance. Messrs. Maclean, Howie, Macdonald Bros. and Harvey deserve mention in this connection for the wonderful improvement shewn in the exhibits as compared with five years ago.

Only one entry for the district competition was tabled, but this one, coming from the Makoni farmers, would have taken a good place even against strong competition. A list of the items in this exhibit is interesting:—Seeds—Wattle, teff, maize (varieties), kaffir corn, wheats, oats, rapoko, buckwheat, pea-nuts, peas, sunflower. Beans—Canadian Wonder,

khaki, haricot. Forage—Rye, teff, pea-nut hay, oats, Sudan grass, veld hay, Napier's fodder, m'fufu. Green Forage—Barley, oats, rye. Meal—Flour (varieties), Boer, crushed monkey-nut. Roots—Mammoth long red mangel, half sugar mangel, swedes, carrots, potatoes, majorda melons, kaffir pumpkins. Sundries—Jam (varieties), bottled fruits, honey, bacon, butter, lard, soap, oranges, apples, lemons, tobacco, wattle bark, native cotton, hemp (carded), wool, turned native woods.

An interesting item was the brooms made from Rhodesian grown broom corn at Penkridge, a struggling local industry which deserves support on account of the merit of the products as well as because of the courageous effort to establish this promising crop in our country.

A very useful class was that provided for stock feeds of all kinds. There were four entries, and whilst none was entirely comprehensive, amongst them they demonstrated what could and should be grown for the winter use of dairy and better class cattle, if not on ranches. For the first time an excellent exhibit of baled maize hay was shewn, Mr. Cockerell being the exhibitor. In view of the admiration it evoked, this item is likely to be included in the competitive classes at future shows, and is well worth adoption. This class included also veld hay, teff hay, lucerne hay, oat hay, dhal hay, ground-nut tops, m'fufu hay, Napier's fodder, silage, green barley, green lucerne, green Napier and green m'fufu, pumpkins, majordas, mangels, carrots, beets, sweet potatoes, mealie meal, cob and corn, whole ground-nuts, and mixed meals of various kinds. This feature of the show was a conclusive proof that the winter feeding of stock is receiving more and more attention, and was instructive as shewing how much can be produced for that purpose.

Fruit, flowers and vegetables formed a magnificent display, adding greatly to the attractive appearance of the spacious new produce shed. Preserves and fruit of all kinds were singularly fine, and oranges were a very strong feature.

Live Stock.—The Committee of the Umtali Society have long laboured under considerable difficulties on account of the prevalence of disease in their neighbourhood and the conse-

Half-Bred Hereford Steer. Bred by Mr. Jobling. Sire, "Devonby Dreadnought"; dam, Africander cow.

quent inability of many farmers to bring their cattle into town. Even this year at the last moment some twenty odd entries, the property of Mr. J. Strickland, were prevented from appearing owing to an unfortunate contravention of the quarantine regulations by certain of Mr. Strickland's servants. Nevertheless, to those who have watched the cattle industry in this district, sound progress in every section of farm stock was apparent, and there is no doubt that the modern practice of keeping a better class of stock and looking well after it is gaining ground in Umtali as fast as in any other part of the Territory.

Owing to the comparatively small number of cattle which could be exhibited, the various classes were very properly made open to beasts of all ages and breeds, but were restricted in each case to beasts for beef purposes, dairy purposes, or dual purposes respectively. While this arrangement necessitated in one case a calf of a few months competing against mature animals, it did not, on the whole, militate against the general usefulness of the show, and it tended to impress upon breeders the necessity of breeding for a fixed purpose and keeping a definite type of beast always in view.

In the open dairy bull class, Mr. English's Wesermarsh Friesland bull beat another Friesland belonging to Mr. Norris and a Shorthorn from the Premier Estate.

In the S.A.B. dairy bull class Mr. Meikle's Jersey beat a Shorthorn from the Premier Estate and a Friesland shewn by Mr. Woodward, which had taken second honours recently at Bulawayo.

In the open beef bull class a very useful Hereford, the property of Mr. J. Meikle, was the only entry.

The S.A.B. beef bulls were represented in order by a Shorthorn bull from the Premier Estate, bred by the late Sir George Farrar, a very nice yearling bull recently purchased by Mr. Barry from the B.S.A. Co., and another young Shorthorn bull from the Premier Estate.

Mr. English's second Wesermarsh bull was the only entry in the open dual purpose class. He also won the championship for the best bull in the yard, and thus with the help of

his stable mate in the dairy class easily upheld the claims of his breed.

The S.A.B. dual purpose class was headed by a nice young South Devon bull, bred by Mr. Bolitho and recently sold to Mr. Barry, the runners-up being two Shorthorn bulls from the Premier Estate and Mr. Woodward's farm.

The female honours were awarded as follows:—

Open Dairy Breeds.—1st B.S.A. Co.'s Shorthorn cow; 2nd Mr. Norris' Friesland.

S.A.B. Dairy Breeds.—1st Mr. Meikle's cow; 2nd Mr. Norris' cow; both Frieslands.

Open Beef Breeds.—The B.S.A. Co., Shorthorn.

S.A.B. Beef Breeds.—Mr. J. Meikle, cross-bred.

S.A.B. Dual Purpose Animals.—1st B.S.A. Co.; 2nd Mr. J. Meikle; 3rd Mr. Webber; all excellent cross-bred cows.

Dairy Heifer (Open).—1st and 2nd B.S.A. Co., with Shorthorns.

S.A.B. Dairy Heifer.—1st Mr. Holdridge; 2nd Mr. English; both Friesland.

S.A.B. Dual Purpose Heifer.—1st Mr. Woodward; 2nd Mr. English; both cross-bred.

Cross-bred Heifer.—1st Mr. Woodward; 2nd Mr. Barry.

Four excellent entries were shewn in the class for three heifers of any breed or cross-breed bred in Rhodesia, the winning pens being three half-bred Herefords bred by Mr. J. Meikle, and three half-bred Shorthorns sent in by Mr. Barry. This class is one we should like to see well patronised, as it indicates in a great degree the value of the various systems of breeding adopted.

The slaughter ox class only accounted for three animals, all of which were in good order, the Eastern Farmers' Co-operative Society and Mr. E. Berry being the winners.

The sheep classes were largely filled by Mr. N. N. Rutherford and Mr. J. Meikle. They were all Merinos, and most creditable in point of view of condition and quality. Mr.

Rutherford, as usual, shewed some excellent grade Angoras. Mr. Meikle won in the slaughter classes.

Pigs were disappointingly few in number, and although little fault could be found with the condition of the animals, they were rather wanting in breeding and type. The need for a few really good breeding pigs in the district appears to be indicated.

The poultry classes were very fair as regards quality, and the same care in preparation for show as in other sections was apparent.

We cannot conclude without offering to the Umtali Agricultural Society congratulations on the excellence and beauty of their ground, and if we may be permitted to make a suggestion, it is that on future occasions separate judging rings should be provided for in order that the judges may be enabled to work unmolested by the public. We feel sure that all judges assisting at their meetings will be grateful for this convenience.

Manuring of Maize on Government Experiment Farm, Gwebi.

By A. G. Holborow, F.I.C.,

Assistant Government Agricultural Chemist.

Since Mr. Blackshaw, Government Agricultural Chemist, laid down his original fertiliser experiments, near Salisbury, the manuring of maize has passed through several phases. The question of applying artificial fertilisers to maize in this country originated in the year 1911, and on that occasion experimental trials were carried out using single fertilisers, *i.e.*, substances containing one element of plant food only, and also with compound fertilisers containing two and three. By this means it was possible to gain some definite knowledge regarding the requirements of the soil, and what constituted the most productive manuring for maize.

The results of these experiments proved conclusively that a judicious application of a *complete* fertiliser dressing is attended with markedly profitable results. The land chosen for the purpose consisted of red diorite formation, which was considered to be of average fertility for experimental purposes. The extremely interesting results then obtained have been clearly set out in previous numbers of the *Rhodesia Agricultural Journal*, viz., August, 1912, 1913 and 1914.

Before proceeding further with the results of this year's field trials, it is well to explain more fully what is meant by a *profitable application* of fertiliser to maize. It is supposed that a zealous farmer is anxious to make his lands the medium for obtaining even greater yields than were previously possible

in the ablest hands. By the application of artificial fertiliser he finds this possible. The crux of the position now is in the actual amount of money placed in the soil as fertiliser before planting, and the value of the increase in the yield obtained directly over and above that produced by similar land on which no fertiliser dressing has been placed. Further, will the value of the increase due to the fertiliser exceed the cost of the fertiliser dressing, and to what extent is the margin of profit? The most economic dressing, roughly stated, is the one which produces the maximum yield when any further increase resulting from the addition of more fertiliser does not pay for the cost of the extra fertiliser used. Land cannot yield unlimited quantities of maize by piling on more fertiliser, and the object of the present experiments at Gwebi was to prove that there was justification in reducing the original quantity of the dressing, and therefore the cost, from 28s. 6d. to 20s. per acre.

This year's results, following on from last season's trials, shew clearly that without any further application of fertiliser the same land that received the dressing last year is capable of still producing large increases in the yield of maize by virtue of the *residual value*. They are corroborative also of our experiences in the years 1913 and 1914.

On the Government Farm where the experiments were conducted in co-operation with the Government Agriculturist, the rainfall returns for the past two seasons were as follows:—

	1914-15. inches.	1915-16. inches.
September	0.36	0.29
October	—	0.19
November	2.14	1.62
December	11.39	2.26
January	7.09	12.04
February	7.58	0.71
March	2.55	3.59
April	0.62	1.56
May	0.08	0.16
	31.81	22.42

The trials were carried out with selected seed maize (Salisbury White variety), which was planted each season on 8th December.

Particulars of preparation and subsequent cultivations of the land each year are as follows:—

Season 1914-15—Ploughed, rolled and disc-harrowed, and finally twice spike-harrowed, cultivated with Hallick weeder and horse-hoed twice during the season.

Season 1915-16—Ploughed, rolled and disc-harrowed immediately before seeding. Cultivations—grubbed twice and hand-hoed once during the season.

Particulars of the manurial dressings, which were applied by hand along the rows after planting, and their effects upon the yield of maize in 1915 and 1916, are given in the following table:—

TABLE I.

Manurial dressing, per acre.	Effect of fertilisers in 1915, first season after application.		Effect of fertilisers in 1916, second season after application.		Combined yields obtained in seasons 1915 and 1916, and increase resulting from application of fertiliser.		Value of two years' increase at 8/- per bag of 200 lbs. on farm.	Cost of fertiliser dressing, per acre. †
	Total yield of grain, per acre. lbs.	Increase due to manuring, per acre. lbs.	Total yield of grain, per acre. lbs.	Increase due to manuring, per acre. lbs.	Combined yield of grain in two seasons, per acre. lbs.	Total increase in two seasons due to manuring in season 1914-15, per acre. lbs.		
Plot 1. No Manure...	2,061*	...	1,291*	...	3,352	...	...	...
Plot 2. 35 lbs. Nitrate of Soda ... 65 lbs. Double Superphosphate 25 lbs. Sulphate of Potash ...	3,293	1,232	2,097	806	5,390	2,038	81/6	20/-
Plot 3. 50 lbs. Nitrate of Soda ... 75 lbs. Double Superphosphate 40 lbs. Sulphate of Potash ...	3,108	1,047	1,831	540	4,939	1,587	63/5	28/6
Plot 4. 70 lbs. Nitrate of Soda ... 130 lbs. Double Superphosphate 50 lbs. Sulphate of Potash ...	3,320	1,259	2,008	717	5,328	1,976	79/-	40/-

* Average of three check plots.

† Pre-war prices.

TABLE II.

Proportion of cobs six inches in length and over to cobs under six inches on the unmanured and manured plots:—

Manurial dressing. *Vide* Table I.	Cobs 6 inches and over in length per cent.	
	1915.	1916.
1	51	26
2	78	47
3	75	43
4	78	56

The dressing that is strongly recommended to maize growers for trial, when the war is over and the price of fertilisers, it is expected, will again become normal, is one that costs 20s. per acre and consists of—

35 lbs. nitrate of soda ... ... } per acre.
65 lbs. double superphosphate ... ... }
25 lbs. sulphate of potash ... ... }

This dressing supplies of—

nitrogen ... ... 5 lbs. } per acre
phosphoric oxide ... ... 27 lbs. }
potash ... ... 12 lbs. }

in a form which is easily assimilated by the plant. It is generally understood that land varies in fertility, and for this reason each farmer should test for himself and make sure that his lands respond to the treatment before venturing an outlay in manuring a large acreage.

Additional Fertiliser Experiments at Government Experiment Farm, Gwebi.

By A. G. Holborow, F.I.C.,
Assistant Government Agricultural Chemist.

Although the fertiliser dressing recommended in other pages of this number of the *Journal* has given such excellent results when applied to maize, yet for obvious reasons it has been thought desirable to extend our field of experimental research. Other substances are available as fertiliser materials, and these may be applied as profitably as those referred to previously. With this object in view, the following field trials were carried out last year. Up till now our experience has been confined to double superphosphate as the source of phosphate, containing 42 per cent. of phosphoric oxide; nitrate of soda, supplying 15 per cent. of nitrogen; and sulphate of potash, containing 50 per cent. of potash. In the present trials basic slag has been substituted for double superphosphate, and blood meal and sulphate of ammonia (both supplying nitrogen) have been introduced partly to replace nitrate of soda. Basic slag is a by-product in the manufacture of steel. It is placed upon the market containing 15 per cent. of phosphoric oxide soluble in citric acid solution, together with 5 per cent. phosphoric oxide present in the insoluble form, making 20 per cent. in all. It also contains lime, is therefore basic in character, and on that account should be well suited to lands that are inclined to be sour. The tendency of the lime would be to neutralise the acidity.

In comparing the functions of blood meal, as a nitrogenous fertiliser, with nitrate of soda and sulphate of ammonia, it is observed that its nitrogen is organically fixed, and therefore not directly available by the plant. On its decomposition in the soil, the nitrogen becomes soil fixed, later soluble in water, and consequently easily accessible. If, therefore, a readily soluble nitrogen salt, like nitrate of soda, be mixed with blood meal, it is done with the purpose of supplying the plant with sufficient nitrogen for immediate use in the initial stages of its growth and to have in store a reserve of nitrogen. Later this store of nitrogen in blood meal becomes slowly available through its decomposition. The rate of decay is necessarily an important factor in the choice of these organic nitrogenous substances. The rate of feeding of the plant with nitrogen is proportionate to the rate of decay of the nitrogenous material, whilst the feeding becomes direct when nitrates are used.

There is another important factor which bears upon the use of materials, like blood meal, that are insoluble. Reference is made to the inconsiderable amount which is leached out by rains, whereas with nitrate of soda the risk lies in the heavy rain waters carrying it away through the soil. We have been taught to look upon the residual value of fertilisers as an important factor in the manuring of maize, and if the nitrogen which has not been absorbed by the crop can be retained by the soil, the succeeding crop will benefit accordingly.

The rainfall at Gwebi and particulars of preparation and subsequent cultivations of the land each year are the same as given in the previous article. Salisbury White variety of seed was used, and planting took place on the 8th of December in both seasons.

The following table shews the particulars of the manurial dressings and their effects upon the yield of maize in 1915 resulting from the direct application of fertiliser, and again in 1916 resulting from the *residual* value of the dressing applied the previous year. The fertiliser was applied by hand along the rows after planting.

TABLE I.

Manurial dressing, per acre.	Effect of fertilisers in 1915, first season after application.		Effect of fertilisers in 1916, second season after application.		Combined yields obtained in seasons 1915 and 1916, and increase resulting from application of fertilisers.		Value of two years' increase at 8/- per bag of 200 lbs. on farm.	Cost of the manurial dressing, per acre. †
	Total yield of grain, per acre. lbs.	Increase due to manuring. per acre. lbs.	Total yield of grain, per acre. lbs.	Increase due to manuring, per acre. lbs.	Combined yield of grain in two seasons, per acre. lbs.	Total increase in two seasons due to manuring in season 1914-15, per acre. lbs.		
Plot 1. No Manure...	2,061*	...	1,291*	...	3,352	...	...	...
Plot 2. 75 lbs. Double Superphosphate	2,823	762	1,764	473	4,587	1,235	49/4	11/3
Plot 3. 130 lbs. Basic Slag	2,806	745	1,912	621	4,718	1,366	54/7	10/6
Plot 4. 75 lbs. Double Superphosphate 40 lbs. Sulphate of Potash ...	2,875	814	1,813	522	4,688	1,336	53 5	18/-
Plot 5. 150 lbs. Basic Slag ... ... 30 lbs. Sulphate of Potash ...	2,943	882	2,060	769	5,003	1,651	66/-	17/3
Plot 6. 12 lbs. Sulphate of Ammonia... 20 lbs. Blood Meal ... ... 65 lbs. Double Superphosphate 20 lbs. Sulphate of Potash ...	3,475	1,414	2,216	925	5,691	2,339	93/6	18/11
Plot 7. 12 lbs. Nitrate of Soda ... 15 lbs. Blood Meal ... ... 20 lbs. Basic Slag ... ... 17 lbs. Sulphate of Potash ...	3,186	1,125	2,053	762	5,239	1,887	75/5	19/11

Plot 7.—Original dressing contained 140 lbs. Basic Slag, costing 19/11.

* Average of three check plots. † Pre-war prices.

In connection with these trials, another interesting feature is the proportion of good ears to nubbins effected by the fertiliser dressings. The following data have been obtained in this respect:—

TABLE II.

Proportion of cobs six inches and over in length to cobs under six inches on the unmanured and manured plots:—

Manurial dressing. *Vide* Table I.	Cobs 6 inches and over in length per cent.	
	1915.	1916.
1	51	26
2	70	45
3	69	46
4	68	38
5	72	51
6	78	52
7	74	44

It will be seen that in normal seasons on red soil the effect of basic slag is in every way comparable with that of double superphosphate, when amounts of each approximating the same cost are applied to maize.

In plot 5 basic slag has been used in conjunction with sulphate of potash. It has been previously demonstrated that sulphate of potash used with superphosphate gives a marked improvement in the yield compared with the use of superphosphate alone, and in these tests (plot 4) this fact has been corroborated. When basic slag replaces superphosphate the effect as here shewn is still more pronounced.

It is with the use of complete fertiliser dressing that we are again compelled to look for the most profitable returns.

At the same time it is observed (plots 6 and 7) that blood meal can be used, partly replacing nitrate of soda or sulphate of ammonia, with marked success. This effect is clearly noticed in the crop resulting from the residual fertiliser in the second season after application. The inference drawn is that the nitrogen has been retained by the soil, as previously explained in this article.

Attention is here drawn to plot 7. It was intended that 140 lbs. of basic slag should be used in the dressing. By misadventure 20 lbs. of basic slag only were incorporated in the mixture. Although the results are good, it is left to the reader to assume what the returns would have been had 140 lbs. of basic slag been used as originally intended. It is reasonable to expect that the returns would have equalled or even exceeded those reaped on plot 6, where double superphosphate was the source of phosphoric oxide.

Again referring to plot 6, it is interesting to note that the complete dressing, containing nitrogen, phosphoric oxide and potash, is responsible for a profit of 74s. 7d. per acre over a period of two years. These two seasons represent the year of the application of the dressing and the first residual year, or second season after application of the fertiliser. This profit is directly due to the manurial dressing, and is over and above the value of the yield on the non-fertilised plot, after paying off the cost of the fertiliser dressing. The profit obtained on plot 2 of the previous article is shewn to be 61s. 6d. per acre for the two years.

With assurance it can be stated that the application of the fertiliser to maize is a profitable investment.

Acknowledgments are due to Mr. J. H. Hampton, manager of the Government Farm, Gwebi, for the field work in connection with the foregoing trials.

A Multiple Attachment for Planters and Cultivators.

By B. A. Bland, Shangani.

As will be seen from the illustration accompanying these notes, the steerable fore-carriage is a four-wheeled contrivance, steerable from a seat on the implement, with a lever or handle attached to the front axle for steering, and a long cross-bar at the back to which may be attached two, three or four planters or cultivators. The implement is made all of iron, strongly built, with strong, light, iron wheels.

The wheels are so set that, when planting is finished and the cultivators are put to work, the wheels run mid-way between the rows of the crop. The machine is fitted with brackets for the attachment of planters or cultivators and a marker for planting. When coupling up, all the farmer has to do is to shorten the disselbooms of his planters, or take them out, as they may be useful for other purposes, and put in shorter ones about 3 ft. 6 in. long. Ordinary 3 in. by 3 in. deal is strong enough. The usual length disselboom can be used, but the shorter ones are advised, because with them one can turn closer at the ends of the lands.

The marker is fitted with a disc at the outer end, and the marker-rod should be set in a straight line with the back cross-bar, otherwise, if the disc is set at an angle to cut the mark, it tends to draw the fore-carriage, and makes it harder to keep straight. The land is marked by means of a short piece of chain, about 3 ft. long, which is hooked to the outer end of the rod, so that it drags on the ground behind, and leaves a well-defined mark for both leader and steersman to see.

Turning at the head lands is quite simple. After a couple of hours' practice the machine can be turned so that every planter, when coming into the land again, is in its right position. The steering handle being rather long, it is always advisable for the steersman to get off the machine whilst turning, as he cannot stretch out far enough from the seat to make a proper turn.

Two oxen are required for each planter used and two for the fore-carriage, that is, six oxen for the implement complete with two planters, eight for three planters and ten for four planters. The natives required for working are the driver, leader and steersman, no matter what number of planters or cultivators may be attached to the fore-carriage. As no boys are needed to sit on the planters, it will be seen that, in the case of four planters, five labourers are saved, but in order to overcome the difficulty of watching the planters to see if they are working smoothly, planting regularly and not collecting weeds and grass in dirty lands, a spare boy should be kept walking behind the planters. He can keep an eye on all of them, and is also a help in filling the seed buckets and shifting round the markers.

The advantages claimed for the steerable fore-carriage are, first, that being steerable, planting can be done in perfectly straight lines and uniformity maintained throughout. With ordinary care, one need not be a foot out of true over a hundred acres. Secondly, after planting is finished, cultivators can be attached to the fore-carriage, and owing to the uniformity of the first planting, and the fact that the cultivating is done with the same contrivance adjusted to the same distances, cultivation may be carried out much closer to the rows of the growing crop than is possible by the ordinary methods. Any kind or make of cultivator may be used, even to sections of the common tooth or zig-zag harrow. By bringing into use four, five or six sections of the zig-zag harrow, the old one-horse hoe can almost be done away with, as the machine fitted with these harrow sections can do five or six rows of maize at a time, and needs only three boys to work it.

The steerable fore-carriage also brings into prominence the old "Cotton King" disc cultivator. Two or three of these attached to the fore-carriage need ten oxen and three natives,

Bland's Multiple Planter. Carriage with Planter attached

and do such perfect work that, after putting them through your lands once, little or nothing more is required, for this cultivator hills up your mealies and covers any weeds in the rows.

A neighbour of the writer, who has one of these fore-carriages, uses it even for his "Superior" small-seeds drill, because with it there is not the risk of overlapping or leaving spaces unplanted which is experienced otherwise.

There seems to be a mistaken idea that a white man is necessary for the working of this implement. Such is not the case, for it is being successfully worked with ordinary Mashona or Matabele natives. In planting, all that is necessary is to set a straight line, and, though a raw boy may make a few mistakes the first day, after that it will be found that he will plant quite accurately. In cultivating it is the same, and it is very seldom a mealie will be touched by the cultivator. With this implement mealies can be cultivated up to 4 ft. in height.

Also, when once a farmer has got into the way of working the steerable fore-carriage, he will find that he can both plant and cultivate more quickly with the combination machine than with single implements.

Hints on Cement Concrete.

By W. Martin Watt, Agricultural Engineer.

As cement concrete is very largely used by the farming community throughout the Territory, the writer trusts that the following hints upon the subject may prove of some assistance.

First and foremost, the cement used must be of first-class quality, and in this connection the writer can fairly state, as the result of experience, that as long as the present standard of the cement locally produced by the Bulawayo Cement Works is maintained, it can safely be used for all classes of concrete work. Concrete, as is well known, consists of a mixture of stone, sand, cement and water, but the proportions in which these several substances have to be mixed together vary very considerably. A mixture of 3 of stone ballast, broken so as to be capable of passing through a 2-inch ring all ways, and of being retained by a 1-inch ring, added to 2 of fine, sharp sand and 1 of cement, all measured in bulk, with an adequate addition of water, makes a high class hydraulic concrete, which, if properly mixed and laid, should be capable, even in the case of thin walls 1 or 2 feet thick, of acting as a water seal. A mixture such as the above allows for a slight excess of cement in the interstices of the sand and a further slight excess of the combined sand and cement mortar in the interstices of the stone ballast, consequently rendering such an admixture, if properly incorporated, water-tight.

In cases where concrete is required for work in bulk, the proportion of the cement to the remaining aggregate may be reduced according to the nature of the work. When a dam wall is required of about 5 or 6 feet in width, a proportion of 4 of stone to 2 of sand and 1 of cement would render it fairly

water-tight, despite there probably being no general excess of finer particles over the coarser. The impermeability of concrete for hydraulic work, whether for weirs, dams or dipping tanks, is frequently assisted by silty matter being drawn into and choking any open interstices that may exist in the work, provided, of course, that these interstices are not of too open a nature. Where concrete is required merely to withstand weight or compressive strength and not as a water seal, the admixture may be cut down to 5 of stone, 3 of sand and 1 of cement, or for coarse work, 6 of stone, 4 of sand and 1 of cement. Such admixtures might be suitable for the construction of floors, stoeps, abutments, piers, foundations, etc.

When mixing concrete, only as much should be wetted as can be immediately used on the work, and no concrete should be placed in any work which has been allowed to stand wetted for over 20 minutes. As some cements are quicker setting than others, it is always advisable wherever possible to cut the above figure down to 10 minutes.

Having secured a good cement, whether imported or local, the next thing is to obtain a stone ballast and sand suitable as an aggregate. The stones should be hard and angular. Water-worn pebbles are absolutely unfitted for the purpose, as they do not efficiently interlock or permit of the mortar binding with them to form an efficient matrix. Quartz, granite, diorite and other similar hard rocks when broken to a suitable size are eminently suitable for concrete ballast, but soft rocks such as our sandstones should be avoided. The sand should be fine, but sharp in texture; the degree of fineness, however, should not by any means approach to that of cyanide tailings. Both the stone ballast and the sand should be absolutely clean and free of clay and other impurities; if not originally so, they should be washed. Where a running stream is available, the most efficient and economical manner of washing can be conducted by depositing the sand or stone at the top of a chute of a sufficient length, and laid at such a grade that the water in running over the material can efficiently wash it and yet carry it to the lower end of the chute.

Mixing should be conducted on a clean mixing board and never on the ground. The board should be of sufficient width and length to permit of about half a cubic yard of the incor-

porated materials being turned over on to a fresh spot on the length of the board at least three times. When mixing, the clean sand, which must be dry, should be spread at one end of the board in its proper measured proportion, the cement should then be added, and this mass turned over at least three times with clean dry shovels towards the other end of the board until the ingredients are thoroughly incorporated. The dry and clean stone ballast should then be added to the mixed sand and cement, and again turned over at least three times. When mixing the ballast, the heaps into which it is turned should not be high, as the natural tendency is for the stone to dribble towards the bottom of the heap, thus preventing a uniform admixture. When watering, only so much of the concrete mixture should be wetted as can be immediately used on the work, and, as mentioned before, no concrete should be placed on the works which has remained in a wet state over 20 minutes. All watering should be done from a watering can fitted with a fine rose; if done heavily or by splashing methods, the fine cement particles will be washed out and carried towards the bottom of the heap, and in consequence the concrete will not be of a uniform strength. The correct quantity of water that should be added to the mixture varies according to the proportion and size of the ingredients used, and therefore cannot be added by measurement. The consistency of the wetted mass should be such that when a mason's trowel is inserted and moved backwards and forwards in it the void left upon its withdrawal should completely but slowly close up. An excess of water is better than too little.

Before mixing is commenced, proper measuring boxes should be constructed. Such boxes are generally square frames without bottoms, and fitted with handles. Supposing, as an example, we were mixing about half a cubic yard of concrete at a time in the proportions of 4 of stone, 2 of sand and 1 of cement; the box for the stone could be made 3 ft. 8 in. square by 1 ft. deep (holding half a cubic yard), for the sand 2 ft. 7¼ in. square by 1 ft. deep (holding a quarter of a cubic yard), and for the cement 2 ft. 7¼ in. by 6 in. deep (holding an eighth of a cubic yard). The usual method of procedure in mixing is to lay the sand box on the mixing board and fill it with sand flush with the top; the box is then lifted, and the remaining sand heap roughly levelled off with shovels. The

cement box is then laid on the sand and filled flush with cement, this box being again removed. After the sand and cement have been mixed as previously described, the heap is levelled off and the stone box laid on it and filled in a similar manner.

Before wetting any concrete, sufficient shuttering should be provided. Shuttering for rough work can generally be constructed of ordinary 9 in. by 1½ in. pine or deal boards, properly stayed and tied. Where a smooth finished face is desired, planed boards smeared with a heated solution of equal parts of soft soap and linseed oil should be used. Plastering to get a smooth face is not recommended for outside work, where variations in temperature are liable to cause cracks and the scaling off of the plaster. In depositing the concrete in the shuttering, care should be taken not to throw it from any height, as this tends to cause the stone ballast to separate from the finer aggregate by falling towards the bottom; in other words, the concrete should be deposited gently. After deposition, the concrete should be worked up by tamping it with a fine tool such as a crowbar or pick handle to get rid of air holes and consequent honeycombing, and to ensure as smooth an outer face as the nature of the shuttering will permit.

A hydraulic concrete may be laid in water, but wherever possible it should not be laid in running water, as this has the effect of washing out the fine cement particles. Where it is impossible entirely to avoid running water, extra cement should be added to the concrete.

Where concrete work has a width of 3 ft. or more, a saving in cement can be obtained by placing large boulders called "plum-stones" in the body of the work. These "plum-stones" should be clean and angular (round boulders are unsuitable), and they should never be allowed to reach nearer to the outsides of the work than 6 in. nor to be placed closer together than 18 in.

When adding new concrete to concrete already set, the surface of the old concrete should be roughened and cleaned with a hard brush (wire if obtainable). The cleaned surface should then be damped and a thin layer of cement mortar laid upon it before new concrete is superimposed.

All concrete, after laying, should be kept damp for a period of not less than seven days, and preferably longer. It must not be left exposed to the varying temperatures of the atmosphere. This can be attained by keeping the work covered with sacks or grass, kept damp by spraying with water.

Concrete can be reinforced against tensile strain by the introduction of steel or iron rods and wires; but as the sectional area of the metal required and the disposition of the metal vary in every case, it is not proposed here to deal with the matter beyond giving a word of warning. While reinforcement carried out on scientific lines effects a saving in the quantity of concrete necessary, it requires more skilful workmanship than plain concrete in bulk, and, unless the structure to be reinforced has been designed by a competent engineer, and a mason skilled in that particular class of work is available, a farmer is here advised to leave it alone. To be of any value, metal reinforcement to concrete must in itself form a rigid structure, and little or no value is attained by laying barbed wire in the concrete, which is a common practice, unless the wire be held taut. Unless the metal reinforcement is taut, it will be obvious that the concrete will fail before the tensile strain can be taken up.

The Construction of Dipping Tanks for Cattle.

REVISED JULY, 1916.

The general recognition of the great value of dipping cattle, both as a preventive of disease and for the maintenance of condition, has led to frequent demands for guidance in the erection and use of tanks. Much attention here and in other countries has been given to this subject, and plans and specifications are now approaching that uniformity which indicates practical finality, and differences of design are mainly in detail and not in principle. *Whilst the accompanying drawings may be taken, therefore, as generally applicable, they are meant to serve only as an indication of dimensions, specifications and accessory requisites of a serviceable and economical dipping tank, and are subject to modification to suit individual ideas and circumstances.* The plans are intended to serve as a model of general applicability, and are not to be slavishly followed in every instance. Throughout the specification and description, trade technicalities have as far as possible been avoided, and such simplicity aimed at that a farmer or handy man may build a tank without recourse to the services of a skilled builder or contractor.

Select a site as near as possible to permanent water, on firm and solid ground; avoid swampy ground or great difficulties may be experienced. If the site is level, fill up the space to be occupied by drip yards with excavated material until sufficient rise is obtained to secure efficient drainage.

Excavate the pit to the size and shape shewn on drawings. To do this carefully mark off the centre line and other dimen-

sions of the tank with wood or iron pegs. Cut down the sides to a straight face, and be careful not to excavate more material than is shewn, otherwise it will necessitate the space excavated being filled with concrete at an additional and unnecessary cost. Cart away or level round the site the excavated material not required for filling in. Provide a mixing board of planks or boards, bedding firmly on sand—10 ft. by 10 ft. is a convenient size—and fasten same together by driving in pegs on the outside. Cover with sand, and with a broom or shovel work the sand into all the joints until the platform becomes firm and solid.

Provide sufficient pine timber for constructing the framework, which should be carefully done. A little extra time occupied in this will be saved many times over at a later stage, whereas a carelessly or badly constructed frame will occasion much difficulty in keeping the walls straight and true to batter, and add considerably to the cost in finishing. Pine timber 3 in. by 2 in. is suitable for struts, braces and uprights, and if placed at suitable distances the lining boards need not be more than 1½ in. thick, and of any convenient width.

The strength of concrete varies considerably, according to the quantity and the quality of the cementitious material used, also according to the nature of the aggregate employed. A coarse, clean sand and broken metal with sharp edges and irregular surfaces gives a material of greater strength than that produced by fine sand and rounded water-worn pebbles, because a better surface is offered for the interlocking of the crystal formation. Stone ballast for the concrete should consist of the best clean granite or quartz, broken in angular pieces, no stone to be larger than will pass through a 1½ in. ring (any way). The stone ballast used must be thoroughly clean, or if not must be well washed before mixing. Water must be clean and free from organic impurities. From 21 to 24 gallons of water are required for every cubic yard of dry material. The sand should consist of the best clean, sharp, granite grit, free from clay, loam or vegetable matter, and if necessary, thoroughly well washed before using. The quality and proportion of the sand used are important factors in producing good work. It should not be too fine in grain, or the particles to be united together become too numerous for the

A typical Dipping Tank.

A Dipping Tank in use

quantity of cementitious material employed; it should be free from muddy or clayey particles, as these deleteriously affect the formation of crystalline silicates of lime and alumina, without which the proper setting or hardening of Portland cement cannot take place. For the best results the mortar consisting of cement and sand should be in just sufficient quantity to fill up the interstices of the stone ballast and produce a compact mass when the whole is bound together. Before commencing to lay concrete the bottom of all excavations must be damped and well rammed. Well ram all round the walls of the tank as the work proceeds. The whole of the materials should be accurately measured in boxes or empty cement casks. The concrete should be composed of five parts broken stone, three parts good, sharp sand, and one of cement, to be turned over twice in a dry state and twice in a wet state, and when laid in place to be thoroughly well rammed. The concrete must be mixed on a wooden or iron platform, and not on the bare ground. The water must not be thrown on in buckets, but sprinkled on through a fine rose. The concrete must be laid down as soon after mixing as possible. In mixing concrete, old material must not be incorporated in the new mixing. All concrete should be laid in boxes made with 1½ in. boards, and no layer should exceed twelve inches in height. Every old layer must be thoroughly cleaned and slightly damped before commencing to add a fresh layer. It is most important that the mixing is thorough, because it is in an imperfectly mixed concrete that cracks and flaws are liable to appear. The best way is to mix the sand and cement together thoroughly in a dry state, then place the stones on the top, mix well together dry, then add the water through the rose of a watering-can, and turn the wetted mass over at least twice before laying. Only sufficient concrete should be wetted and mixed as is immediately required.

Sometimes in the case of soils liable to much expansion and contraction, a good plan is to lay down a bed of clean, sharp sand, 6 in. or 12 in. thick, on which the concrete is subsequently placed. This better distributes the pressure, and will often prevent unequal settlement. It is also a good plan to reinforce the floor, slope and walls with steel bars, which combine with the concrete in such a way as to prevent fracture.

After thoroughly consolidating the ground by ramming, lay the floor of drip yards with 4 in. of concrete as described above, packed to a regular grade and finished with the rammer. After completion, and while yet green, prepare a liquid grout of one part of cement to one of sand, run it over the same, and brush over lightly with a straw or bass broom; form the necessary channels in same for conducting the drippings to the well. All concrete must be kept well watered and covered with damp sacks or grass as the work proceeds, and all walls should be kept well wetted for a week after completion. The floors of tank, race and dripping run should be covered with wet sand for 14 days after completion. The floors of race and dripping run ought to be V jointed, diagonally from the centre to sides every 18 in., joints $\frac{1}{4}$ in. deep. All concrete must be thoroughly well rammed. The concrete must be laid as quickly as possible, and the whole of the materials must be on the ground before commencing to mix them. All concrete should be mixed under supervision, and the contractor should give due notice of his intention to lay the same before commencing work.

Before putting up the framework, lay the floor and inlet and exit slopes with concrete to the dimensions shewn on the drawing, and prepare for same by carefully levelling and driving into the ground fine iron pegs or pins, which should project above the surface of the ground to the face of the concrete; put in similar pins up the slopes. In laying the concrete these will be useful for guides, and for working the straight edge from point to point.

The laying of the floor first is a most important matter, and cannot be too strongly insisted upon, as cracks which have sometimes appeared in the walls have been traced to a departure from the specification in this particular. By laying the floor first, and taking special care at the junction of the slope, a wide slab of concrete is constructed on which the walls are subsequently built, and if the work is well done, any tendency of the superincumbent walls settling will be rendered fairly uniform, and the dangers of irregular settlement considerably minimised. Build in four rows of barbed wire all round the walls—four wires in each row. The first should be placed 12 in. from the floor, then at intervals of 1 ft. 10 in.

apart, well tied to iron uprights at the angles. This will further help to prevent irregular settlement taking place. Lay the wires in the position shewn on section, to run right round the tank, and all to unite; top, bottom and side wires. Wire to be four-barb, two-ply, with barbs 6 in. apart. All wiring must be drawn taut.

The surface of floor in race, in dripping run, and bottom of tank must be floated up with one of cement to three of sharp sand, to be well trowelled and brought to a smooth, fine face. The edge of floor of race, at entrance of tank, must be rounded. The surface of slope leading out of tank is to be finished rough, for foothold of cattle, by racking up the surface after ramming or by introducing rails. The floor of dripping run must be 4 in. thick at the sides, and slope $\frac{1}{2}$ in. towards the centre. Near the exit of tank leave a hole in the floor of dripping run, to be 3 in. in diameter, fitted with a 3 in. outlet pipe. Fit a wooden plug with an iron top and ring. The plug must be left in place when dipping, and should be removed during rains to prevent rain water running into the tank. On each side of the dripping run lay a dwarf wall of concrete, to be 6 in. wide, to prevent dip washing over the floor of race when cattle enter the tank. The wall will start from ground level, and will be 12 in. or more at the end near tank. After completion plaster the walls and floors of tank with one of cement and three of sharp sand, steel trowelled, to be not less than $\frac{1}{2}$ in. thick; walls well roughened and wetted before applying the plaster. Plastering should not be attempted in the heat of the day, nor during a frosty morning or evening. The plastering should if possible be completed in one day, and should be applied while the concrete is still "green."

The entrance to the tank has been designed so as to prevent cattle trying to jump out sideways, instead of plunging into the dip. Some tanks are built narrow at the entrance for this purpose and to economise concrete, but this entails additional difficulty and labour in construction, involving more expense. The ledge, which allows of handling stock in difficulties, does not extend the whole length of the tank, but terminates within 9 ft. of the entrance, so as to prevent stock from using it to try to avoid the plunge. Beyond this ledge is the splash wall, which may be built of brick, faced or pointed in cement.

All important dimensions are indicated on the drawings, and these should be strictly adhered to, unless it has been decided beforehand to construct the tank to other dimensions. The length of the tank may with advantage be increased by 4, 6 or even 8 ft., ensuring a more thorough soaking of all cattle passing through, and the length shewn in the drawing should be regarded as a minimum. The slope down to the tank is often made much steeper than shewn for the last 2 ft., and given slight steps, which prevent wily and experienced cattle from sliding in gently and launching themselves into the swim without that immersion of the head which is so essential for tick destruction. In several tanks the width at the bottom has been reduced from 2 ft. 3 in., as shewn, to about 1 ft. 9 in., with a view to lessening the quantity of dip in the tank at any one time. This saving is more apparent than real, for the loss of the dip is mainly that removed by each animal, and the main saving is derived from the prevention of splash and of loss in the dripping run and drying pen. The exit should be provided with ridges to give a grip to the feet, for which cement or short lengths of rail, pipes, or 16 lb. fence posts are admirably adapted. The whole of the posts may be of mopani or mohobohobo, or some similarly suitable native timber, which should be not less than 5 in. diameter at the small end, stripped of bark and well carbolineumed before erecting. The race will be formed of poles or rails as shewn on plan. Posts for yards should be not more than 10 ft. from centre to centre, let into ground 18 in., and well rammed. All posts must be 6 ft. above the ground, and free from knobs or projections. Well spike to posts round the whole of the yards and enclosures three or more $4\frac{1}{2}$ in. by $1\frac{1}{2}$ in. rails, all well carbolineumed before fixing. The posts must be dressed quite clean to prevent injury to cattle. Rails may be deal, clean and free from knobs and splints. Native timber may be used for rails if procurable, but it must be straight and quite free from knobs or projections that might cause injury to animals. A few slip rails should be available in order to prevent cattle from backing out of the entrance race. Such rails might be of smoothed native timber about 4 in. diameter.

Both the entrance race and exit run may be built either straight or curved, as may be found best suited to the site

selected and for the arrangement of the kraals. On the accompanying drawing these are for convenience shewn straight.

The dripping run need not necessarily be built as a narrow run all the way as shewn, but may very usefully be widened into a concrete or slab-paved pen or kraal, where a larger number of cattle may be kept and allowed to drip more thoroughly. The arrangement of the kraals is also a matter in which a wide discretion with common sense is permissible, depending on the configuration of the site.

The size of the collecting kraal will depend upon the numbers to be handled at one time, and as a guide, 18 square feet per beast may be regarded as a convenient allowance, though a kraal 60 ft. by 30 ft. would accommodate about 100 head comfortably. Drinking water should be provided in troughs in this yard, or somewhere convenient for the stock before entering it, as animals entering a dipping tank suffering from thirst are very liable to drink from the dip as they pass through. On leaving the dripping run it is well to keep the herd in a resting kraal till dry to prevent poison being distributed on the surrounding veld. The tank itself should for similar reasons be fenced off from adjacent ground for a distance of about five yards all round. Within this space drums of dip and any appliances used in dipping may be kept. The tank or sump for the reception of the old dipping fluid when the dipping tank is being cleaned out should be similarly protected. When the walls and floors have become dry, select a warm day with good sunshine, and coat the whole of the floor, exit and inlet slope and walls up to the water line with hot coal tar, well boiled, with 1 lb. of pitch added to each gallon of tar. When the same has become dry it should receive a second coat of the same material, which should be well worked into all corners and angles. This will tend to close the pores and prevent undue absorption. One gallon of tar and 1 lb. of pitch will cover 11 square yards the first coat, and a larger area the second coat. In filling the tank for the first time a certain quantity of fluid will be absorbed and lost through leakage and absorption. These losses, however, may be expected to become reduced as the tank is refilled and the minute particles in the water or dip fill the coarser interstices of the concrete.

The quantities of material required are as follows:—

Pipes—

10 pieces 1½ in. diameter pipe, 6 ft. long, across exit.
1 piece 3 in. diameter pipe, 4 ft. 6 in. long.
1 piece 3 in. diameter pipe, 1 ft. 9 in. long.

Timber—

Rails, 6 pieces 12 ft., 4½ in. x 1½ in.
Rails, 12 pieces 14 ft., 4½ in. x 1½ in.
Rails, 48 pieces 20 ft., 4½ in. x 1½ in.
Slip rails, 6 pieces 10 ft., 3 in. x 3 in.
Slip rails, 3 pieces 15 ft., 3 in. x 3 in.
80 posts, 5 in. diameter, 7 ft. 6 in. long.
30 posts, 5 in. diameter, 8 ft. long.
9 pieces, 15 ft. long, 9 in. x 1½ in., deal.
3 pieces, 17 ft. 6 in. long, 9 in. x 1½ in., deal.
4 pieces, 11 ft. long, 9 in. x 1½ in., deal.
2 pieces, 7 ft. long, 9 in. x 1½ in., deal.

(Native wood may be used in the place of imported timber.)

1½ coils barbed wire.
15 gallons carbolineum.
50 lbs. 5 in. spikes.
44 casks (88 bags) cement.
33 cubic yards broken stone.
24 cubic yards sand.
1,600 bricks.

The entrance race should, where possible, incline slightly upwards to within a short distance of the tank so as to keep back dirt, dung and liquid from polluting the tank, and the last few feet only incline towards the tank. This is shewn on the drawings, but may not always be practicable. The slight bar shewn at the very commencement of the concrete race is often overlooked. This is very essential to prevent flood water coming into the tank from the direction of the collecting kraal. In a very complete tank lately built, the cattle in passing along the race from the collecting kraal to the tank are made to walk through a concrete foot-bath or trough a few inches deep filled with water so as to clean their feet and prevent the mud sticking to them from entering the tank and

polluting the dip. The entrance race must be strongly built to withstand the pressure of the cattle, and may either consist of rails of native wood, not more than one foot apart, or of 1½ in. boards. The wings extending from this fence over the tank should be made of planks to prevent animals seeing out over the side, and so being tempted to get out that way. The posts must be securely fixed and supported with strong stays. Old rails are often used for this purpose. The dripping run should not be less than fifteen yards long, and additional length implies further saving in the dip draining off, especially where large numbers are to be handled and the animals are not allowed to stand in this run. The return of dip from the dripping run into the tank and the diversion of rain water falling on the race are provided for by pipes through the kerb edge, one leading outwards, the other passing back into the tank as shewn on the drawings. Another method is to carry a pipe through the kerb into a small settling cistern (say, 12 in. x 18 in. x 24 in. deep) constructed alongside the dripping run, and out of which a second pipe leads back into the tank at a lower level after sediment has been deposited. By means of wooden plugs, the dip or rain water from the dripping run may be carried into the tank or drained away. At the exit the barrier between the dripping run and the tank is usually made too small to divert rain water from entering the tank on that side, an accident likely to occur, as the drying kraal is generally placed on a slope above the tank. This inflow of storm water must be guarded against, as it fills the tank with dirty water and leads to complete confusion as to the strength of the solution in use. Care at the outset on these details saves much subsequent trouble.

A pulley tackle is a great convenience for dealing with obstreperous beasts. The rope may either be adjusted round the horns, or a large loop carried right over the back, under the tail, and along the flanks, a method which renders resistance of little avail.

The following schedule gives the approximate capacities of a tank built strictly to the dimensions shewn on the drawing, but as it is only in very rare instances that tanks are built exactly to these dimensions, it should serve as a guide only, and is not to be relied upon when mixing the dip. The only

accurate method of ascertaining the capacity of any dipping tank is by means of introducing the dip (or water) from a smaller tank (or buckets) of known dimensions. A tank of, say, 100 gallons capacity could be erected in such a position that its contents can be emptied into the dipping tank. The level attained by each emptying, which in this case is equivalent to 100 gallons, can then be indelibly marked on the side of the tank or on a gauge post placed in the tank.

Depth.			Depth.		
Ft.	In.	Gallons.	Ft.	In.	Gallons.
0	0	0	4	0¾	1,600
0	4¾	100	4	2¾	1,700
0	9	200	4	4¾	1,800
1	0¾	300	4	6½	1,900
1	4½	400	4	8¼	2,000
1	8	500	4	10	2,100
1	11½	600	4	11½	2,200
2	2½	700	5	1	2,300
2	5½	800	5	2½	2,400
2	8½	900	5	4	2,500
2	11¼	1,000	5	5½	2,600
3	1¾	1,100	5	7	2,700
3	4	1,200	5	8½	2,800
3	6¼	1,300	5	10	2,900
3	8½	1,400	5	11½	3,000
3	10¾	1,500	6	0	3,060

Hints on Dipping.—As proprietary dips are now generally used instead of the arsenite of soda or Natal Laboratory dip, it is only necessary to state that full instructions are supplied with each tin, and these should be rigorously adhered to.

In order successfully to accomplish the object for which the process is practised, viz., the destruction of ticks, it is essential that the fluid be maintained at the proper strength. If it falls below this, ticks are not destroyed, and so much time and money are wasted; if it becomes too strong much injury may be caused to the animals dipped, and in some cases serious mortality may ensue.

The strength of the fluid is altered by evaporation or by addition of water. It is pure water only which evaporates, and evaporation, therefore, results in an increase of the strength of the remaining fluid. The addition of rain and flood water naturally causes a diminution in the strength of the

fluid. If the following procedure is faithfully adhered to, the strength of the fluid will be maintained at, or sufficiently near for practical purposes, the proper strength. After each dipping the depth of the fluid in the tank should be accurately measured, and the result recorded in a book specially kept for the purpose; it is fatal to trust to memory in a matter of this sort, where the result may be so serious. Immediately before the next dipping the depth should again be measured, and any difference in the quantity of the fluid accurately calculated. If there has been a decrease, water alone to the extent of same should be added. If there has been an increase, dip should be added in proper quantity to make such increase equal in strength to that which is being used in the tank. On no account should this procedure be omitted even where the increase or decrease is small, because the repetition of such must result either in the fluid becoming so weak as to be useless, or so strong as to be injurious and even fatal.

Each animal that passes through the tank takes with it a quantity of the fluid, estimated at between half and one gallon; the level of the fluid in the tank is thus gradually lowered. To make up this deficiency, water with dip in the proper proportion must be added.

The chief reason for dipping is the destruction of ticks, which are transmitters of various diseases, amongst which in cattle may be mentioned African Coast Fever, Gallsickness and Redwater. It is, however, against the spread of Coast Fever infection by this agency that dipping is now so largely practised. But it has been found that the dipping of cattle has many other advantages. Apart from the disease-bearing capacities of ticks, it is evident that their presence on animals is a serious drawback, chiefly because of the large quantities of blood extracted, which should go to growth, or to improvement in condition, or to the increase of the milk supply. Not the least of the benefits of dipping is the reduction of the mortality amongst calves from white scour, liver disease, etc. Instances can be given where such mortality has been reduced from 60, 70 or even 80 per cent. to nil.

Apart from Coast Fever areas, where short intervals are necessary, dipping as a general measure should be practised

every seven days. Fortnightly dipping, or dipping only when ticks are seen on the animals, is of very little value. This is evident when it is considered that our most dangerous ticks, *i.e.*, those which transmit Coast Fever, only remain on an average four days on the bovine host. In many cases animals which to the eye are apparently free from ticks will on close examination be found to harbour large numbers of the larvæ and nymphal forms, especially in the ears, where some of the Coast Fever-bearing ticks are most commonly found. It should be remembered that the ticks most commonly seen are the engorging females, that the males are small, and on a beast with an average coat not easily seen. During the winter months, when ticks are comparatively inactive, the interval may be lengthened to 14 days, or dipping may be suspended altogether, but in the summer months, more especially the earlier ones, the shorter interval, even the three-day interval where there is a gross infestation, should be practised.

It is advisable to give working cattle a day's rest after immersion in the tank, but some farmers inspan them as soon as the skin is thoroughly dry. Where seven-day dipping is practised, the dipping can be carried out on the Saturday afternoon, thus giving the animal at least 1½ days to recover.

Opinions vary as to the effect of dipping on milch cows. Some assert that the quantity of milk is decreased to a large extent for 24 hours, and even longer, after dipping; others say that the effect in this respect is not appreciable. Assuming, however, that there is a slight immediate loss, it should be remembered that there is a general increase because of the better condition of the animals as the result of regular dipping.

View on Sabi River.

Evaporation,

CLEVELAND RESERVOIR, SALISBURY.

July, 1915, to June, 1916.

Below we give twelve months' records of evaporation as taken at the Cleveland Reservoir, near Salisbury. The figures, with which we have been supplied by the courtesy of Mr. J. P. Horsfield, Town Engineer, will give some idea as to the extent of evaporation to be reckoned with in this country. This is a factor of great importance that must be taken into account in all calculations respecting the available capacity of storage reservoirs. In future the monthly figures for evaporation at the Cleveland Reservoir will be included in the Weather Bureau tables at the end of the *Journal*.

Year.	Month.	Monthly Evaporation. Inches.	Daily Maximum. Inches.	Daily Minimum. Inches.	Daily Mean. Inches.
1915	July ...	5·39	0·21	0·11	0·18
1915	August ...	6·92	0·29	0·19	0·23
1915	September ...	8·61	0·40	0·06	0·29
1915	October ...	11·26	0·45	0·20	0·37
1915	November ...	8·99	0·51	0·13	0·29
1915	December ...	7·87	0·35	0·00	0·25
1916	January ...	6·41	0·35	0·02	0·21
1916	February ...	8·72	0·40	0·14	0·30
1916	March ...	7·99	0·41	0·09	0·26
1916	April ...	7·16	0·32	0·05	0·24
1916	May ...	6·57	0·32	0·08	0·21
1916	June ...	5·26	0·21	0·08	0·17
	Total ...	91·15		Average Mean	0·25

The Market for and Value of Ground Nuts.

In a report of a committee appointed to enquire into the subject of edible and oil-producing nuts and seeds, which was issued as a parliamentary blue book in June of this year, it is stated that at the outbreak of the war the total European import of ground nuts was 670,000 tons per annum. Of this, France took three-quarters and Germany and the Netherlands nearly all the remainder, Germany taking nearly 100,000 tons, and the Netherlands two-thirds of that amount.

In the same blue book, at the conclusion of an exhaustive report on feeding experiments framed by Professor Crowther, Professor of Agricultural Chemistry and Director of the Institute for Research in Animal Nutrition in the University of Leeds, the following table is given for the "fair prices" of the undermentioned cakes, in which it is interesting to observe that ground-nut cake takes easily the first place, and a high value even in England.

	"Fair Price" per Ton.	
	For Fattening Purposes.	For Milk Production.
Ground-nut cake	£12 8 0	£13 1 0
Decorticated cotton cake	11 3 0	11 13 0
Cocoanut cake	10 18 4	10 11 0
Palm kernel cake	10 1 0	9 16 0
Undecorticated cotton cake ...	6 8 0	6 8 0

Review.

A LIST OF RHODESIAN PLANTS.

The Royal Society of South Africa has just published, in its *Transactions*, Vol. V., Part 4, a paper by Mr. F. Eyles, F.L.S., entitled "A Record of Plants collected in Southern Rhodesia." This is a compilation made up to the year 1915, and includes the names of all plants known to have been collected in Southern Rhodesia from the time of Dr. Livingstone down to the present day. It is, of course, not quite complete, for the compiler failed to secure all the records of foreign botanists. The largest gap is probably the omission of the results of recent work by German botanists on the important collections made by Dr. Engler when he visited this country with the British Association in 1905. We understand that application was made to the Berlin authorities for this information some years ago, but without success.

The present record, with its comprehensive index, runs to nearly 300 pages, and includes 2,397 species of plants, besides 112 varieties. The arrangement of the list is somewhat novel, and is designed specially to assist students of the local flora. The system of classification followed is the most modern and natural, known as Engler's system, and it is the same as that adopted by Mr. J. Burtt-Davy for the Transvaal Museum. The Record is more than a bare list of plants, for it includes also, under each species so far as ascertainable, references to all those authorities wherein the student may find full descriptions of each plant, such as the Flora Capensis, the Flora of Tropical Africa and others. It also gives, so far as known, full details regarding the collection of each specimen, such as locality, altitude, month of year and collector's name. Thus at a glance may be seen the distribution of any plant so far as recorded. It is perhaps a defect that the

Record does not make any attempt to give the native names of our local flora, especially in respect to plants of economic value. We understand that the idea of doing this had to be given up owing to the great diversity of dialects in Rhodesia, which makes accuracy very difficult. This subject might well be taken up by our Native Commissioners and workers in the botanical field, who, if they will give their assistance, might enable the Department of Agriculture to bring out a list of the native names, in different dialects, of all our best known plants, and in particular of all plants of actual or potential economic value.

The present Record of Rhodesian Plants will be the foundation of all future botanical systematology in this country, and forms a basis on which it will be comparatively simple to build up a Rhodesian "Flora." It is bound to be of great use to the schools and to all interested in our flora, and we congratulate Mr. Eyles on his production, which has taken years of close study and hard work. His labour of love forms a valuable contribution to science in Rhodesia.

E. A. N.

Correspondence.

TREATMENT OF WOUNDS CAUSED BY WILD ANIMALS BY INJECTIONS OF PERMANGANATE OF POTASH.

To the Editor,

Rhodesia Agricultural Journal.

Sir,

I note that a Rhodesian is enquiring for a remedy for animals mauled by lions, tigers, etc., stating that he has applied permanganate of potash with but poor results. It might be worth while publishing the following for general information, it being the writer's own experience, extending over a period of about five years.

Case I.—Best yearling bull mauled by a tiger; my first experience. Examined beast, no teeth marks on it, and apparently only slightly mauled, although herd boy stated he beat off the tiger. Decided not too apply remedies of any description, but to keep beast under close observation and watch developments. First three days he was apparently unaffected, the scratches being scarcely discernible. Fourth day, animal shewing signs of pain. Fifth day, near hind leg swelling, apparently blood poisoning setting in or bone damaged, though not fractured. Sixth day, beast unable to move. He eventually died and was opened up and closely examined, shewing symptoms of blood poisoning.

Case II.—Aged native cow mauled by lion, both hind quarters being badly wounded, with scratches, open wounds and teeth marks. The animal also appeared to be suffering from shock. I applied permanganate of potash liberally to all scratches and wounds externally only, and administered a tonic. The outward applications of permanganate were used in order, if possible, to ascertain the effect of this drug so applied, although plenty of other veterinary medicines

were available at the time. Results were more or less as expected, for cauterising externally does not reach the seat of the injury. The beast died, was opened up and carefully examined, especially at the wounds. I was satisfied that, if good results were to be looked for, injections must be tried.

Case III.—Yearling calf was badly mauled, mainly inside the near hind leg, the leg being fractured above the hock and swinging. One wound was clean through the inside of the leg above the fracture. I experimented as follows:—After thoroughly washing the wounds and injecting permanganate freely with the syringe, I put the leg in splints. As there was no scratch within four inches of the fracture, I was able to splint with comparative safety, though the splints were short. All wounds, every deep scratch and even pin wounds were injected with strong solution of permanganate, which was of a strength to discolour the fingers just perceptibly after contact with it. The needle of syringe was inserted through the skin towards the wounds on two sides, and results closely watched. Apparently the vital period is on the third and fourth days. On the second morning another injection was made on the third side of each wound, and on the fifth day the fourth side of each wound was injected. Permanganate was applied externally to cauterise, as flies were troublesome. The animal was well tended and pulled through. The leg set all right, and the beast was later sold for £8.

Case IV.—Native cow was badly mauled in vicinity of the udder; the near hind leg was very stiff, one wound being five inches through the inside of the leg. This animal was saved by repeated injections of permanganate, and it is to-day alive and well, and rearing calves regularly.

Case V.—Four native cows were attacked while the herd of cattle was drinking at the river. One was killed, two mauled and the fourth apparently untouched. Of the two which were mauled, one had a wound right through from side to side at the back of the udder between the legs. This one is alive to-day, and was pulled through with repeated injections of permanganate. The second of the mauled animals was lost for one day, and so went unattended for that time. When found, she was seen to be most severely injured, and had to be

brought into camp on a sleigh, looking an utter wreck, and apparently too far gone to do anything with. However, I decided to experiment with the usual injections. After lying down for quite five months, she ultimately pulled through, but would always have been lame, though she was able to get around the camp and pick up grass. Nine months after date of attack she was killed for native meat, saved to that end by permanganate of potash injections.

Case VI.—A favourite dog attacked a tiger near the house one evening, and was carried off by the tiger. We turned out with lamps and guns, and, after a considerable chase in the dark, rescued the dog. When fired at the tiger released the dog, which crawled to my feet and dropped. On examination at the house, the dog was found to be fearfully mauled and lacerated, all the wounds being in the neck, shoulders and front legs. In one place the teeth had met, as there was a hole completely through the neck. After stitching up the wounds I injected permanganate, and made the patient comfortable for the night, quite expecting to find her dead next morning. For three weeks she never moved, except to turn over or around, but ultimately recovered, though I lost her later from the after effects of biliary fever.

I could go on relating several cases more, including a native who was mauled by a crocodile. All the cases were brought through by the use of permanganate of potash injections. I tried other remedies, but without avail, and I never saved an animal till I started injecting permanganate freely. Now I get to work as quickly as possible, losing no time before making injections, and in very severe cases affected by shock also, I give a gargle of permanganate, allowing the animal to swallow a small quantity, as I firmly believe from experience it has a beneficial effect. All cattle suffering from injuries as above described must be well nursed, wounds kept thoroughly clean, constitution built up and bowels kept in good working order.

F. Chambers.

Chiredzi Ranch,
Ndanga.

[*Note.*—Mr. Chambers's letter on the treatment of wounds in animals caused by lions and tigers is most interest-

ing and instructive, and well worthy of the careful consideration of stockowners who are worried by the depredations of such brutes. Permanganate of potash is a powerful oxidiser, readily parting with its oxygen, which on being freed forms harmless compounds with foul smelling gases and liquids, thus acting as a very efficient deodoriser. In a similar way it destroys disease-producing germs, and thus is a disinfectant. The successful results obtained by Mr. Chambers are largely to be attributed, I think, to the radical method of applying the solution, viz., by injection around the wounds. The teeth and claws of wild carnivora are notoriously septic, and wounds caused by them are fatal in a very large precentage of cases unless properly treated. One of the greatest difficulties in treatment is that the wounds are frequently of a punctured nature, the tissues closing up after the withdrawal of the tooth or claw, and really bottling up the pathogenic germs. External applications to such wounds cannot be satisfactory; they must either be opened up or treated by the method which Mr. Chambers has had such good results from.—C. V. S.]

THE MONKEY-NUT.

Note.—Mr. C. E. Tulley, who wrote on this subject in our last issue, has sent us a reply to some of the points raised in the editorial footnote we then appended to his letter. His present letter is too long for reproduction, but his arguments may be summarised as follows:—

He still thinks the Marseilles market is available, because we "export mealies of twice the weight and the same cubic capacity." This is incorrect, for the French market receives only shelled nuts, a bag of which is nearly equal in weight to a bag of maize. Even if unshelled nuts could be exported, their high cubic measurement in relation to weight would adversely affect the freight rate.

Mr. Tulley, as the result of later experience, now agrees with us that the ground-nut crop is subject to the depredations of wild animals.

He continues to advocate the ridging of this crop, and says "if nuts are not ridged, I fail to see how they can give a good return." This is contrary to the results obtained at the Gwebi Experiment Farm, where, as may be seen in an article in this *Journal* dealing with last season's experiments, a trial was made specially to settle this very point, the best yields being taken from plots planted on the flat. Owing to the dryness of the season, however, judgment on this point should be withheld until the experiment has been repeated under normal conditions of rainfall. Some of the largest growers confirm this result so far as the growing of groundnuts on our red soils is concerned.—Ed., *R.A.J.*

A DEFENCE AGAINST WEEVILS.

In reference to Mr. Chambers's letter on the above subject, which appeared in the June *Journal*, certain enquiries were made, and in response to them, Mr. Chambers has kindly furnished us with the following supplementary information:—

"'Would it not help to make the scheme plainer if something were mentioned of the nature of the store building to be coated with cow dung?' The building referred to is an ordinary pole and dagga hut, poles to be of native timber not liable to attacks by ants, and hut to be of any convenient size as required, but for preference not too large. Hut to be filled to height of walls only, with poles laid closely on top of walls and also dagga'd on top on the native system, thus forming a crude air-tight compartment. A light, rough frame of thatch is usually made on the ground, and when completed, is bodily lifted and placed over structure to keep out rain."

"'Is it suggested to coat with cow dung ordinary European buildings of brick or wood and iron?' Most emphatically, No! Except to close up all holes at eaves or top of walls, etc. It is not necessary for a large building to be air-tight, so long as the portion where the mealies or other grain is stored is rendered so, or made impervious to attack by weevil, as suggested in my previous letter."

"With regard to the two modes of treatment I then described, I have kept seed mealies for eighteen months by simply plastering with cow dung, passing a reim round centre of sack and suspending to beam, examining from time to time to see if dung had fallen off, and on opening at end of that period have found grain absolutely sound. Ashes, also, in addition to protecting against weevils, assist greatly in keeping ants away, for, if sufficiently thick and fresh when applied, ants will not penetrate for a considerable time."

"Before committing a large quantity of grain to either of the treatments recommended by me, I suggest trying a single sack, or a few bags only, and I feel confident of the result."

F. Chambers.

Chiredzi Ranch,
Ndanga.

Proposed Rhodesian Exhibit for the Rand September Show.

In connection with the proposal to make an exhibition of Rhodesian crops at the forthcoming Stock, Maize and Citrus Show of the Witwatersrand Agricultural Society at Johannesburg on 27th to 29th September, the Director of Agriculture, Salisbury, would be glad to receive any exhibits of special merit to add to the collection secured from the various districts' exhibits at the recent Salisbury Show. A representative exhibit is already assured, and any additions would be welcome which would serve to demonstrate the products of this country on the Rand, where lately our cattle have made so favourable an impression.

The Agricultural Outlook.

Our district reports indicate that the harvesting of maize and other summer crops is well advanced. The yields are turning out very much as anticipated, ranging from the poorest districts registered as "nil," to the best, where a crop two-thirds of last year's is probable. By the latter is meant two-thirds of the total, but taken from an increased acreage, and, therefore, less than two-thirds of the normal yield. Winter crops, taking the country as a whole, will be much below average, for many low-lying vlei lands, which in ordinary seasons are moist enough to carry crops without irrigation, this year are so dry that no attempt has been made to utilise them. Tobacco crops are generally reported to be fair, and a marked exception in a disappointing season is the pumpkin and cattle melon crop, which has been unusually heavy, shewing that this class of plant thrives best when the rainfall is light. This applies specially to the melon, and should serve as a useful reminder that majordas may often be successfully grown in situations and soils where maize would be unprofitable.

Stock generally, up to the time of writing, continues to be in good condition, and, except as regards Coast Fever, no disease is reported. Early frosts in some districts injuriously affected the grazing, so that the natural pasturage can hardly be expected to be sufficient to carry over to the rains. In other districts, where the pasturage is regarded as good enough to last till the end of winter, a shortage of water is feared, and mobs of cattle are already being moved into more favourable situations. In Matabeleland it is only those farmers who have made ample provision, in the way of wells, hay, ensilage, etc., who can look forward with confidence to the next two or three months. In the richer grass veld and mealie belts of Mashonaland, stock owners are better off, for their maize stalks constitute a valuable stand-by, especially if cut early and stacked, and when they are finished the veld grass, though coarse, is fairly abundant, and many Mashonaland farms have good grazing in their bottom lands to tide them over the last few weeks of winter.

Veterinary Report.

May.

AFRICAN COAST FEVER.

Salisbury District.—No fresh outbreaks and no cases of disease at any of the infected centres.

Mazoe District.—A fresh outbreak occurred in a small herd of cattle on the farm Welbeck, belonging to the Salvation Army; one beast affected. The herd is being slaughtered by the butcher, and the fencing of the farm is proceeding.

Melsetter District.—Two fresh outbreaks occurred, viz., on the farms Jameson and Morgensen. The mortality during the month was as follows:—Roslyn, 3; Wolvedraai, 1; Helvetia, 7; Geluk, 2; Thabanchu, 1; Jameson, 2; Morgensen, 1; total, 17 head.

Mrewa District.—On 8th May the Native Commissioner, Mrewa, examined some sick cattle at Mrewa's Location. *Post-mortem* examinations shewed lesions which in his opinion were those of Coast Fever; microscopic examinations amply confirmed his diagnosis. On further investigation several small herds in the immediate vicinity were found infected. Fortunately a large area of clean and unoccupied ground was available, and all the cattle were immediately removed to a temperature camp thereon. The construction of a dipping tank at this camp was immediately begun and was in use three weeks after the arrival of the cattle. The total number of cattle involved was 451 head, of which 51 died or were destroyed as affected with Coast Fever; during the period of observation at the temperature camp 34 head were destroyed on suspicion. A Government Notice was promulgated providing for the compulsory dipping of all cattle in a large area around the infected centre, and arrangements made for the erection of the necessary tanks.

A police cordon was established around the infected area, and regular inspection of all cattle for a considerable distance outward instituted.

In enquiring into movements of cattle which had taken place from Mrewa's Location prior to the detection of the disease there, the Native Commissioner discovered that two head moved thence to Makawasa's Kraal, about 15 miles west of Mrewa, had died shortly after removal. Although positive evidence that these animals died from Coast Fever is unobtainable, it must be presumed that they did. As a matter of precaution, therefore, and to prevent further infection in the vicinity, Makawasa's herd (17 head) was destroyed, and arrangements made for the erection of a dipping tank for the native cattle in that section.

At Mrewa Station there was a number of transport oxen which had been to Mrewa's Location some time previously; one of these died as the result of very severe spraying with an arsenical solution; another was destroyed on shewing a temperature of 107. *Post-mortem* and microscopic examinations proved negative. Although there is little risk of infection on the veld concerned, it was considered advisable to remove the herd to clean veld. No further suspicious cases occurred.

Gwelo District.—On 27th May two animals were reported dead on the farm Riverbend, in the northern section of the district. The carcases were somewhat decomposed, but microscopic examinations left little doubt that African Coast Fever existed. The herd was at once placed under observation, and as a dipping tank, which, judging from the grossly tick-infested state of the cattle, had not been much used, was available, three-day dipping was at once instituted.

CONTAGIOUS ABORTION.

The existence of this infection was discovered on the farm Bluewater, Salisbury district.

MALLEIN TEST.

The following animals were tested with mallein on importation, with negative results:—Horses, 84; mules, 49; donkeys, 99.

IMPORTATIONS.

In addition to the above, the following animals were imported:—Bulls, 72 head (13 from United Kingdom); heifers, 167 head (22 from United Kingdom); sheep and goats, 1,976.

EXPORTATIONS.

During the month 989 head of slaughter cattle were forwarded to the Johannesburg market. The carcase of one of these was found to be affected with tuberculosis on inspection at the abattoirs.

June.

AFRICAN COAST FEVER.

Salisbury District.—No fresh outbreaks and no cases of disease at any of the infected centres.

Mazoe District.—The remaining cattle on the farm Welbeck were slaughtered.

Mrewa District.—The cattle removed from the infected area to clean veld remain perfectly healthy. The dipping interval was extended from three to five days.

Gwelo District.—The existence of African Coast Fever on the farm Riverbend was demonstrated in several animals by *post-mortem* and microscopic examinations. During the month 15 head were destroyed.

A fresh outbreak occurred on the adjoining farm Cross Roads. One animal was destroyed and another died; the latter shewed positive lesions of Coast Fever on *post-mortem* examination and the diagnosis was confirmed microscopically.

MALLEIN TEST.

The following animals were tested with mallein on importation, with negative results:—Horses, 68; mules, 41; donkeys, 169.

IMPORTATIONS.

In addition to the above, the following animals were imported:—Bulls, 26; heifers, 97; sheep and goats, 1,602; pigs, 8.

EXPORTATIONS.

During the month 1,602 head of slaughter cattle were forwarded to the Johannesburg market. One animal was found to have tuberculosis on *post-mortem* inspection at the abattoirs.

J. M. SINCLAIR,
Chief Veterinary Surgeon.

Farming Calendar.

August.

BEE KEEPING.

Now that warmer weather prevails, hives can be opened with safety and examined. Do this when the sun is shining and without exposing the bees too long. The queens are now laying, and, should there be a scarcity of food, feed the bees with syrup inside the hive. Where a hive carries a fair supply of honey, queens can also be encouraged to produce eggs by crushing with a knife blade the cappings of sealed honey still remaining in brood combs. This month and next bees will be collecting nectar and pollen from fruit and bush bloom. Where strong south-easterly winds prevail, hive entrances should be shielded. This will afford bees great assistance in their going out and coming in.

CITRUS FRUITS.

Orange trees should already have been pruned, and are now ready for the first irrigation. The first growth should be commencing early in the month, and by this time the trees should already have had one good soaking. As soon as the trees have set their fruit they should never be allowed to stop growing through lack of moisture, otherwise the fruit is liable to be poor in quantity and lacking in quality. After irrigation, cultivation should follow, and the earth round the trees be loosened with a spade. If fertiliser is to be used, it should be applied after the first irrigation, so as to be thoroughly incorporated with the soil in the cultivation following.

CROPS.

Provided there are no heavy frosts, dhal may be allowed to remain until August before harvesting. As a second or third year crop, dhal can always be cut earlier, say towards the end of June or in July. Castor beans should be harvested as the pods ripen, which they continue to do for a considerable period. Ploughing should be undertaken continuously wherever possible; the value of early ploughing cannot be over-estimated. Ploughing should be followed as soon as possible by harrowing. Mangels can be pulled and fed as required. The ensilage pit can now be opened, and the contents fed. Seed potatoes should be worked over, and decayed tubers removed.

Crops under irrigation will require but little attention. In oat crops, where the seed has been obtained from the Union, care should be taken to weed out any Drabak or Darnel (*Lolium temulentum*) that may be growing among the crop, as this weed is poisonous. Care should also be taken not to over-irrigate any of the lands.

ENTOMOLOGICAL.

Potato.—Early planted crops of potatoes may be attacked by caterpillars. The crops should be sprayed immediately with an arsenical wash.

Cabbage Family.—Young plants of this family should be kept sprayed with an arsenical wash to check attack by web worm. Do not spray plants of which the foliage is eaten within three weeks of use.

Onion.—May still be troubled with thrip. Use tobacco wash or paraffin emulsion.

Deciduous Fruits.—Any trees infested with scale may be sprayed with a winter wash during August. Lime sulphur salt wash or scalecide is recommended.

Guava.—Collect and destroy remnants of late crops to keep down citrus codling, especially if trees are in vicinity of citrus orchards.

FLOWER GARDEN.

This is a busy month, and the soil should be kept in good tilth. Roses, shrubs and ornamental trees may be planted. All seeds may now be sown. Marguerite carnations sown now will flower by the end of the year. Cuttings of carnations and other perennials should be planted either in the open ground or in boxes, using loose and well-decomposed soil for the latter, taking care that they are well drained, or the success will be small.

FORESTRY.

Sow seeds in nursery beds of quick-growing species, such as gums. Plant out poplars and other deciduous trees. Prepare soil for filling tins for young plants.

GENERAL.

Fireguards should be completed and every precaution taken to guard against loss of grazing from fires. Natives commence ploughing their softer land this month, and for this reason, as well as because beer is plentiful at the kraals, local labour is apt to be scarce. At this time of the year, however, the need for boys on farms is not so severely felt as later on.

POULTRY.

Keep the young stock growing, and give plenty of ventilation to their sleeping quarters as the nights grow warmer. A good supply of green food and a small quantity of powdered charcoal in the soft food will keep them healthy. Do not hatch more chicks than you can safely house and attend to when they mature.

STOCK.

Cattle.—On the early granite and sand veld probably the worst of winter is over so far as grazing is concerned, and a nice bite of green grass is appearing. Care should be taken where cattle are allowed to graze on the early burnt grass not to let them get too much at first. On diorite farms the haystack will still be required, and in all cases a certain amount of hay or ensilage should be held in reserve against the possibility of very late rains. The bulls may again be put back into the herds. Any very young calves should be kept near home, and dipping should be carefully attended to. In dairy herds on any soil whatever, feeding, housing and bedding cannot be relaxed. Cows in full milk will benefit by a ration of, say, 5 lbs. of maize (crushed and soaked), 30 lbs. to 40 lbs. of ensilage or pumpkin and 8 or 10 lbs. of hay. If it is possible to give, in addition to the above daily ration, 2 lbs. of peanuts, crushed with the shell, or linseed ground with maize, or peanut cake, a very great benefit will be derived. Calves, especially young ones, must be carefully watched; they should not run too far, and are better inside, except when the weather is warm. A little sweet hay, bean meal, linseed, peanuts or peanut cake and a small ration of green food will pay to feed to them.

Sheep.—Sheep should give little trouble at this time of the year, but on very dry veld a handful of mealies and a little hay or ensilage will materially assist ewes with young lambs.

VEGETABLE GARDEN.

All vegetable seeds may now be planted. Those having but a limited supply of water would be wise to sow in boxes, transplanting when large enough. The seed beds require careful preparation; they should be well raked up and laid out in long narrow rows in order to facilitate watering. The tops of the beds should be levelled as near as possible, and when sown, covered over with a thin layer of straw or grass, which will prevent the seeds being washed out when watering and the soil from caking.

VETERINARY.

Redwater and gallsickness occur all the year round, although these diseases are more prevalent during the summer months. A good many deaths occur this month, however, amongst imported stock. Vegetable poisoning will probably be in evidence. Sheep can be inoculated against blue tongue. Scab is a poverty winter disease.

WEATHER.

No rain is to be expected, and even on our eastern mountains the precipitation is trifling. Showers, however, do occasionally fall in places, but are of no consequence. The sun is often warm during the day, but the nights are apt to be cold, and grazing being scarce, food and shelter are necessary for the stock.

September.

BEE KEEPING.

In sheltered localities many trees in the bush will now be in bloom. Should there be indications of swarming, put on a crate of sections or shallow frames, correctly fitted with super-foundation. Where a swarm has been secured, place it in a modern hive, and from an established stock remove a frame of comb containing unsealed brood and honey, shake off the adhering bees on to their own alighting board, then insert this comb into the centre of the newly hived swarm. This plan compels the bees to start work at once. As a means of preventing the escape of the queen, a narrow strip of excluder zinc may be fastened at the entrance. This should be removed after about two weeks.

CITRUS FRUITS.

If the trees were irrigated early in August, the next application of water should be given about the first or second week of this month. After irrigation, cultivation should follow. Constant attention should be given to young trees, and a watch kept for any adventitious shoots or suckers, which should be cut away at once. This should be attended to right through the growing season.

CROPS.—See August.

ENTOMOLOGICAL.

Tobacco.—Young plants in seed beds may suffer from cutworms. See Handbook of Tobacco Culture, published by Agricultural Department, pp. 71-90.

Potato.—Early potatoes are liable to suffer from caterpillars. The crop should be sprayed at first sign of injury with an arsenical wash.

Cabbage.—During this month the most prominent enemies of plants of this family are diamond back moth and webworm. Cabbage louse is sometimes troublesome. The young plants may be sprayed or dusted with an arsenical compound for the former, and sprayed with tobacco wash and soap for the latter.

Beans planted under irrigation during September usually escape serious infestation with stem maggot.

Citrus Trees.—Scale insects commence to increase rapidly with the advent of warmer weather, but the trees should not be sprayed or fumigated while in blossom.

FLOWER GARDEN.

Although our spring advances with this month, rains are very uncertain and usually scarce, but in spite of circumstances plants now grow with very little encouragement. Perennials and shrubs should be well attended to, especially those which flower early; the soil should be kept well stirred around the stems, and they should be watered if necessary.

Practically all flower seeds may now be sown in boxes, nursery beds, or in the open ground where they are to be grown. Nursery beds are perhaps preferable, as a great deal of watering may have to be resorted to on account of late rains. All annuals sown in July should now be ready for transplanting; should these be few, and a larger show of flowers desired, the heads may be pinched out after planting, which makes the plant spread out more and become bushy. Shrub and ornamental tree seeds should be sown now if desired for planting out during the rainy season, and may be sown in the open; if it is desired to hasten them they should be planted in boxes and covered with glass, and placed in a sunny position sheltered from the winds. If summer bulbs have not already been re-planted, this should be done at once; they sprout as the weather becomes warmer, and, if allowed to do this before planting, the bulb loses much of its vigour. It must be borne in mind that all bulbs that cluster, if divided, produce better blooms, and the plants have a better appearance than the old cluster, which has a lot of decayed matter and generally a ragged appearance; this also applies to those perennials which may be increased by division of roots.

FORESTRY.

Sow in nursery beds any seeds that were left over from last month. Where wattles are grown for bark, stripping can be commenced this month. Prepare soil for filling tins. Any young trees that are large enough should be pricked out into tins.

GENERAL.

Indigenous labour is apt to become more scarce at this time of year, the boys returning to their kraals to break up the land for next season. Stock are liable to stray in search of the young grass now coming up, and much trouble from this cause is to be looked for on unfenced farms. Natives are now cultivating their gardens preparatory to sowing their crops, which they do much earlier than do Europeans. The mischief caused by veld burning becomes apparent from this time onwards in the condition of the stock, and it is necessary frequently to move them away in search of grazing.

POULTRY.

Thoroughly overhaul all the houses before the rains. Do not wait for the first shower to indicate where the leaks are. Early hatched cockerels should be separated from the pullets by now.

STOCK.

Cattle.—Ranching cattle should require little now in a normal season; it is only in the event of very late rains that trouble should be expected. Where

possible, it will be wise to keep an eye on those cows that may be expected to calve early, with a view to feeding them if necessary, and seeing that they do not get too poor. The dairyman will carry on much as in August; he will, however, use his discretion (in accordance with the condition of his veld) as to the use of ensilage, pumpkins or other bulky and succulent food. He will be wise not to shorten the supply of concentrated foods for some time to come. A little hay or ensilage should still be kept in reserve until the rains have fallen in reasonable abundance.

Sheep.—The remarks for August apply. If spring lambs are expected, it will be wise to see that the sheep shed is in good order—clean, dry, properly drained and airy. Watch that the ewes shall not be poor when they lamb, and remember that they cannot rear good lambs if the veld is bad, but must have their grazing supplemented, just as milk cows are fed in order to produce milk.

TOBACCO.

Begin sowing seed beds each week for the acreage proposed to be planted; fertilise and push them so as to be ready for planting out should rain come early in November.

VEGETABLE GARDEN.

Most seeds may now be sown, though there is risk of losses from want of rain. Watering, of course, can be resorted to. Marrows, pumpkin, melon, cucumber and peas may be planted in the field after the first rains. Tomatoes that have been sown earlier should be planted out, and these as they come on should be staked.

VETERINARY.

There should be very few deaths from redwater and gallsickness this month. Cases of vegetable poisoning of stock picking up tempting young green shoots of dangerous character on the burnt veld are of frequent occurrence. Sheep can be inoculated against blue tongue, but ewes in lamb should not be treated, on account of the danger of abortion. Scab may be prevalent.

WEATHER.

The temperature may be expected to rise steadily during this month. Rains are not due until next month, though the average over a period of years shews slightly more than in the previous four months, and ranges between .1 and .5 inch. Frost has been known to occur in September, although this is a very unusual event. Rain-gauges should be seen to before the rains commence. They should be carefully adjusted to stand exactly level with the lip four feet above ground, and care should be taken that no tree, building or other obstruction interferes with the fair precipitation of rain into the orifice.

Weather Bureau.

TEMPERATURES.

Station	May		June	
	Mean Max.	Mean Min.	Mean Max.	Mean Min.
MASHONALAND—				
Charter—				
Enkeldoorn	74·6	45·2	72·26	42·16
Hartley—				
Gatooma	81·6	47·9	78·3	44·7
Hallingbury Farm	77·8	42·7	75·0	40·3
Hartley Hospital	81·1	43·9	78·3	41·5
Idaho	79·6	42·5	—	—
Lomagundi—				
Eldorado Mine	77·55	42·74	75·57	38·9
Kanyemba	89·8	61·6	85·2	55·8
Sinoia	81·8	49·6	78·0	47·0
Sipolilo	77·4	47·0	76·4	43·4
Makoni—				
York Farm	—	—	—	—
Mangwendi—				
Kwenda Hospital	70·8	54·7	69·2	53·36
Mazoe—				
Shamva Mine	79·03	47·84	75·68	44·13
Melsetter—				
Melsetter	72·7	47·0	69·2	46·2
Mount Selinda	70·2	47·8	68·9	44·4
Vermont	75·0	50·4	74·9	48·8
Salisbury—				
Chishawasha	74·5	45·8	73·7	42·0
Salisbury (Gaol)	75·4	45·4	73·6	41·2
Umtali—				
Chiconga's Location ...	76·3	46·7	72·3	43·1
Public School	—	—	—	—
Summerfield	64·0	—	61·2	—
Victoria—				
Eythorne	72·4	42·5	69·2	39·0
Morgenster	—	—	—	—
Victoria	75·19	42·74	73·43	38·0
MATABELELAND—				
Bulalima—				
Plumtree School	75·8	48·4		
Tegwani	—			
Bulawayo—				
Essexvale	78·77	41·93	78·36	36·46
Holly's Hope	78·2	43·9	76·4	40·6
Hope Fountain	73·08	46·6	—	—
Observatory	73·3	46·3	—	—
Rhodes Matopo Park ...	80·3	47·5	77·3	44·5
Gwanda—				
Antelope Mine	77·9	51·93		
Gwelo—				
Gwelo (Gaol)	75·9	38·5	73·1	34·4
Hagley (Iron Mine Hill) ...	74·2	43·9	72·8	40·5

TEMPERATURES—*(Continued).*

Station	May		June	
	Mean Max.	Mean Min.	Mean Max.	Mean Min.
MATABELELAND—(Continued)				
Mangwe—				
Empandeni	77·6	42·0	77·0	39·9
Garth	76·6	44·4	80·48	41·1
Tuli—				
Mazunga	83·9	47·1	81·2	45·2
Tuli	81·4	47·0	79·15	41·3
Wankie—				
Victoria Falls	83·3	35·0	79·4	28·0
Wankie (Hospital)	91·2	54·4	85·9	49·6

RAINFALL.

Station	May	June
MASHONALAND—		
Charter—		
Buhera	Nil	—
Bushy Park	—	—
Central Estates	—	—
Driefontein	Nil	—
Enkeldoorn	,,	Nil
Grootfontein	—	—
Induna Farm	Nil	Nil
Marshbrook	,,	,,
Range	0·05	,,
Riversdale	—	—
Spitzkop	—	—
Umniati	—	—
Umvuma (Railway)	Nil	—
Vrede	—	—
Wylde Grove	Nil	Nil
Chilimanzi—		
Orton's Drift	—	—
Hartley—		
Ardgowan	0·07	Nil
Auchter Leny	Nil	,,
Battlefields (Railway)	,,	—
Carnock Farm	0·15	Nil
Clifton Farm	0·37	,,
Elephant Hill, Battlefields	Nil	,,
Elvington	1·20	,,
Gadzema (Railway)	—	—
Gatooma	Nil	Nil
Gatooma (Railway)	,,	—
Gowerlands	0·53	Nil
Hallingbury	Nil	,,
Hartley Hospital	0·29	,,
Hartley (Railway)	0·40	—

RAINFALL—*(Continued).*

Station	May	June
MASHONALAND—(Continued)		
Hartley—continued		
Hopewell ...	1·26	—
Idaho ...	0·26	—
"Jenkinstown"	0·12	Nil
Makwiro	0·21	—
Makwiro (Railway)	0·25	—
M'pofha Farm		—
Philiphaugh	0·38	Nil
Shagari	Nil	,,
"Stoneygate"	..	..
Lomagundi—		
Argyle	0·27	Nil
Banket Junction (Railway)	0·06	—
Darwendale	0·25	Nil
Duxbury Farm	0·60	,,
Eldorado (Railway)	Nil	—
Eldorado Mine	0·05	Nil
Golden Kopje Mine	Nil	,,
Kanyemba	..	..
Lion's Den		
Lone Cow Estate	0·43	Nil
Longmead	0·71	,,
Palm Tree Farm	1·24	,,
Sinoia	0·04	,,
Sinoia (Railway)	Nil	—
Sipolilo	0·09	Nil
Umvukwe Ranche		
Makoni—		
Chimbi Source		
Eagle's Nest	0·42	0·03
Ellavale	0·20	—
Farm Carlow	Nil	
Gorubi Springs	0·05	
Inyanga	0·32	0·12
Mona		
Monte Cassino Mission	0·42	Nil
Odzi (Railway)	Nil	—
Rusape (Railway)	..	
Springs		
St. Trias' Hill	0·01	0·24
York Farm		
Mangwendi—		
Bonongwe...	0·05	Nil
Glen Somerset	0·50	—
Huish Estate	0·08	Nil
Kwenda Mission	Nil	,,
Land Settlement Farm		
Macheke (Railway)	2·14	
Marandellas		
Marandellas (Railway)	0·83	
Mtoko	Nil	Nil
Mrewa	..	..
Nelson	,,	,,
Selous Nek	0·38	0·05

RAINFALL—(*Continued*).

Station	May	June
MASHONALAND—(Continued)		
Mangwendi (continued)—		
Theydon	1·12	Nil
Tweedjan	Nil	,,
Verdoy	0·40	,,
Mazoe—		
Avonduur	—	—
Bindura	0·58	Nil
Bindura (Railway)	0·77	—
Ceres	0·72	Nil
Chipoli	Nil	,,
Citrus Estate	0·82	—
Dunmaglas	1·17	
Jumbo (Railway)	0·51	—
Kilmuir	2·68	—
Laguaha	Nil	Nil
Lowdale	—	—
Mazoe	—	—
Mguta Valley	—	—
Mount Darwin	0·02	Nil
Omeath	1·64	—
Ruia	0·97	—
Ruoko Ranche	1·18	—
Shamva	0·29	—
,, Mine	1·09	0·02
Stanley Kop	0·46	Nil
Sunnyside	1·96	,,
Teign	2·25	,,
Volynia Ranche	0·90	,,
Melsetter—		
Brackenburg	0·14	0·51
Chikore	0·21	0·28
Chipinga	0·66	—
Helvetia	0·56	0·08
Melsetter	0·09	0·23
Mount Selinda	0·70	0·25
Mutambara Mission	0·02	
Pasture	Nil	0·25
Tom's Hope	0·31	1·07
Vermont	0·91	Nil
Salisbury—		
Ardbennie	0·91	Nil
Avondale	0·15	,,
Botanical Experiment Station	0·83	—
Bromley	0·45	0·10
Brookmead	—	—
Borrowdale	—	—
Chishawasha	1·10	0·04
Cleveland Reservoir	1·44	0·07
Forest Nursery	1·36	—
Glenara	—	—
Goromonzi	0·83	—
Gwebi	0·16	0·09
Hillside	1·08	Nil
Lilfordia		

RAINFALL *(Continued).*

Station	May	June
MASHONALAND—(Continued)		
Salisbury—continued		
Salisbury (Gaol)	1·73	Nil
,, (Railway)	1·70	,,
Sebastopol	1·16	—
Selby	Nil	—
Stapleford	0·13	—
The Meadows	—	—
Vamona	1·10	0·14
Westridge	0·56	0·02
Umtali—		
Chiconga's Location	0·24	0·01
Odzani	0·06	0·28
Penhalonga		—
Premier Estate	0·01	—
Public School	—	—
Sarum	Nil	0·43
Stralsrund	,,	Nil
Summerfield	,,	,,
Umtali (Railway)	,,	—
Utopia		
Urungwe—		
Nassau Estate	0·09	—
Victoria—		
Bikita	0·34	0·17
Brucehame	Nil	Nil
Chibi	,,	,,
Chilimanzi	0·04	—
Chingombe	Nil	Nil
Chiredzi Ranche, Ndanga	0·02	—
Clipsham	0·02	Nil
Eagle's Nest Ranche	0·18	
Empress Mine		
Eythorne	0·03	Nil
Fairburn	0·05	,,
Fort Victoria (Railway)	0·09	—
Gokomere	0·04	Nil
Gutu	0·05	,,
Makorsi River Ranche	0·06	,,
Marah Ranche	Nil	,,
Marthadale	—	
Morgenster	—	
Ndanga	0·29	—
Nuanetsi Ranche		
Pamushana	Nil	Nil
Silver Oaks	0·04	0·03
Tokwe River Ranche	0·07	—
Victoria	0·02	0·08
MATABELELAND :		
Belingwe—		
Albany	Nil	Nil
Anglo-French Block	..	,,
Filabusi	..	..
Fort Rixon	..	0·04

RAINFALL *(Continued).*

Station	May	June
MATABELELAND—(Continued)		
Belingwe—continued		
Infiningwe	Nil	0·08
Insiza (Railway)	,,	—
Orangevale	,,	Nil
Roodeheuvel	,,	,,
Scaleby	—	—
Shangani Estates	Nil	—
Shangani (Railway)	,,	—
Tamba	0·17	Nil
Thornville	Nil	,,
Wedza	0·09	0·01
Bubi—		
Inyati	Nil	—
Leighton Farm	—	—
Lochard Experiment Farm	—	—
Bulalima—		
Mholi (late Magot)	0·06	—
Plumtree School	0·03	—
Riverbank Farm	0·01	Nil
Solusi Mission	0·10	,,
Syringa	Nil	,,
Tegwani	—	0·01
The Retreat	—	—
Tjompanie	—	—
Bulawayo—		
Balla Balla (Railway)	Nil	—
Bembesi (Railway)	,,	—
Crombie's	,,	—
Edwaleni	—	—
Essexvale	0·02	0·10
Government House	—	—
Gwaai (Railway)	Nil	
Heany Junction (Railway)	,,	—
Holly's Hope	0·09	—
Hope Fountain	Nil	—
Imbesu Kraal	0·01	0·02
Impondemi	—	—
Keendale	0·03	Nil
Khami	0·11	,,
Lower Rangemore	Nil	,,
Matopo Mission	0·08	0·05
Maxim Hill	Nil	Nil
Melinakanda Junction	0·08	—
Naseby	Nil	Nil
Nyamandhlovu (Railway)	,,	
Observatory	0·02	—
Raylton (Railway)	Nil	—
Rhodes Matopo Park	0·06	Nil
Springs	0·06	..
Umkien	—	
Umgusa		

RAINFALL *(Continued)*

Station	May	June
MATABELELAND—(Continued)		
Gwanda—		
Antelope Mine	Nil	—
Gwanda (Gaol)	0·07	Nil
Gwanda (Railway)	Nil	,,
Mtshabzi Mission	0·10	,,
West Nicholson (Railway)	0·25	—
Gwelo—		
Daisyfield	Nil	Nil
Dawn	,,	—
Globe and Phœnix (Railway)	,,	—
Gwelo (Gaol)	,,	Nil
Gwelo (Railway)	,,	—
Hagley	0·05	Nil
Indiva Farm	—	—
Lalapanzi (Railway)	Nil	Nil
Lovers' Walk	,,	,,
Lower Gwelo	,,	,,
Oaklands	,,	,,
Que Que	,,	,,
Rhodesdale Estate	,,	,,
Selukwe (Railway)	,,	..
Sikombela Farm	,,	,,
Troy	—	—
Woodendhove	—	—
Mafungabusi—		
Gokwe	—	—
Inyoka	Nil	Nil
Mangwe—		
Empandeni	Nil	Nil
Garth	0·06	—
Tuli—		
Lamulas	0·24	0·25
Langalanga	0·06	Nil
Makalali	0·18	0·34
Manantji	Nil	0·15
Mapande	0·05	Nil
Mazunga	0·24	,,
Tuli	0·22	..
Wankie—		
Bombusi	Nil	Nil
Malindi (Railway)	,,	—
Victoria Falls	,,	Nil
Victoria Falls (Railway)	,,	—
Wankie Hospital	,,	Nil
Wankie (Railway) ..	..	

– No return.

Dates of Meetings of Farmers' Associations, Southern Rhodesia

(SUBJECT TO ALTERATION)

Name of Association	Place of Meeting	Secretary	1916		
			August	September	October
Beatrice Road	Various farmhouses	H. W. Harris	9	13	11
Bembesi	Queen's Mine Hotel	V. C. Andrews	4	1	6
Bindura	Bindura	A. C. Mills	12	..	14
Bromley	Bromley	A. A. Draper	3	7	5
Charter—Mgezi	Beatrice Mine	W. Krienke	30	27	25
Central	Umvuma	B. M. Yorke	26	30	28
Eastern Border (South Melsetter)	Helvetia	J. T. Jollie	11	8	13
Enterprise	Arcturus Hotel	J. Watson	2	6	4
Felixburg	Felixburg	R. H. Brown	26	30	28
Figtree Branch, R.L. and F.A.	Figtree Hotel	W. H. Robertson	5	..	7
Gatooma	Gatooma	T. J. Golding	19	16	21
Gazaland	Chipinga	W. Wood	26	30	28
Greystone	Roodeheuvel Farm, Shangani	J. W. Spencer	12	9	14
Hartley	Hartley	J. de L. Nimmo	12	9	7
Headlands	Headlands	J. M. Harvard	26	..	28
Hunter's Road Farmers and Stockowners	Hunter's Road Siding	R. H. Twilley	12	9	14
Insiza—Shangani	Shangani	T. E. Penny	..	2	..
Iron Mine Hill Proper	Iron Mine Hill	T. Irving	12	9	14
Lalapanzi and Iron Mine Hill	Lalapanzi and Iron Mine Hill	Cyril Allen	12	9	14
Lomagundi	Sinoia	S. R. Garrard	19	16	21
Macheke	Macheke	W. J. K. Webster		No fixed dates	
Makwiro	Makwiro	T. R. McLellan	18	15	20
Marandellas and Mangwendi	Marandellas Farmers' Hall	A. Nicholson	5	2	7
Makoni	Rusape	H. Barnes Pope	5	2	7
Marula	Marula Siding	Mac. W. Ingram	26	23	25
Mashonaland	Commercial Hotel, Salisbury	J. Reid Rowland	2	6	4
Matopo Branch, R.L. and F.A.	Sibali	————	..	13	..
Mazoe	Glendale Siding	T. J. Mossop	9	13	11
Melsetter (North)	Various farms	Rev. R. Wodehouse	..	2	..
Midlands	Gwelo	P.O. Box 23, Gwelo	12	9	14
Northern Umtali	Farm "Summerfield"	R. O. H. Blurton	5	..	..
Norton and District	Norton Siding	————	5	2	7
Que Que	Que Que	E. J. Ross	19	16	21
Rhodesian Landowners and Farmers	Library Buildings, Bulawayo	H. S. Hopkins	25	29	27
Shamva	Shamva	J. M. Moubray	..	20	..
Selukwe	Selukwe	F. S. Clark		No fixed dates	
Somabula and Shangani Flats	Weltevrede School	G. B. Botha	..	9	..
Umvukwe	Various ranches	S. A. S. Colborne	12	9	..
Umtali	Christmas Pass Hotel	J. S. Holland	5	2	7
Victoria	Victoria	H. S. Hoatson	16	20	18
Vungu	Vungu	J. H. Erasmus	..	..	..
Western	Plumtree Hotel	A. Barclay	12	9	1

Departmental Notices.

Information for Farmers

The Department of Agriculture is prepared to furnish to farmers technical advice either by correspondence, or, where possible, by personal visits. All communications should be addressed in the first instance to the Director of Agriculture.

Crops

The Agricultural Branch deals with enquiries relating to agricultural practice, soils, crops, cultural operations, processes, seeds, trees, farm implements and machinery, etc.

Disposal of Pure Seed.

Farmers devoting special attention to the production of pure seed of any locally grown crops are invited to communicate with the Government Agriculturist, and at the same time to submit a $\frac{1}{4}$ lb. sample of any seed which they may have for disposal.

In addition to indicating the total amount of seed offered and the price f.o.r. the nearest railway station or siding, the correct name of the variety and the origin of the seed from which the crop was grown should be given. In the case of special attention having been devoted to seed selection, the methods employed should be described.

Where these stipulations are complied with, and the samples forwarded are deemed by the Agriculturist of sufficiently high quality for seed purposes, growers and intending purchasers will be put in touch with one another. It is hoped by this means to encourage the production of pure seed, and growers are urged whenever possible to sell their seed under guarantee of trueness to name, type and sample deposited with the Department.

After placing growers and would-be purchasers in touch with one another, the Department can accept no further responsibility except in the position of adjudicator when bulk

supplies are thought inferior to sample and description, in which case both parties will be required to abide by the decision of the Department.

For further particulars see article on Pure Seed Supply, *Rhodesia Agricultural Journal*, February, 1914.

Farm Seeds

The undermentioned seeds grown on the Government Experiment Farms are now available for sale at the prices stated. The prices are f.o.r. Salisbury, or, when available, from the Gwebi Experiment Farm.

All orders for seed must be addressed to the Government Agriculturist, Department of Agriculture, Salisbury.

(1) *Specially* selected seed maize, Salisbury White, Hickory King 10 row and Hickory King 8 row, 15s. per 100 lbs.

The above shelled seed has all been carefully selected, tipped, butted and hand-shelled. Supplies are limited, and in order to meet the large demand, not more than one to two bags can be supplied to each applicant.

(2) Japanese buckwheat, 10s. per 100 lbs.

(3) Dhal, 2d. per lb., 15s. per 100 lbs.

(4) Black sunflower seed, 2d. per lb., 15s. per 100 lbs.

(5) Yellow Cross wheat, 15s. per 100 lbs.

(6) White flowering linseed, 6d. per lb.

(7) Spanish and Virginia Bunch ground nuts, 20s. per 100 lbs.

(8) German millet and Boer manna, 3d. per lb.

(9) Teff grass seed, 2d. per lb., 15s. per 100 lbs.

(10) Feterita and Texas Red kaffir corn (new introductions), 15s. per 100 lbs.

(11) Kherson's 60-day oats, 24s. per bag of 120 lbs.

(12) Natal Black cow pea, 2d. per lb., 15s. per 100 lbs.

(13) Iron bark pumpkin seed, 2s. per lb.

(14) Majorda melon seed, 1s. per lb.

(15) Velvet bean seeds, 25s. per 100 lbs.

(16) Napier fodder roots, 3s. per 100, £1 per 1,000.

On account of the limited supply of seed available in some cases, it is impossible to guarantee the full delivery of any order. Farmers are therefore requested not to enclose cheques until they are advised as to the amount of seed allotted to them. The seeds are consigned carriage forward in the case of stations. In the case of sidings the amount of railage should be added. Delivery will commence about the middle of September.

Co-operative Seed Distribution

The following seeds of summer crops are offered f.o.r. Salisbury for trial under the usual terms of co-operative experiments. The experimenter is required at the close of the season to forward to the Agricultural Department, on forms supplied for that purpose, an accurate report of the result of his experiments.

Seed is supplied in sufficient quantity to sow from $\frac{1}{4}$ to 1 acre according to variety, and not more than four varieties can be sent to any one applicant. All applications, together with full particulars regarding forwarding, should be addressed to the Government Agriculturist, Department of Agriculture, Salisbury.

1. *Summer Cereals.*—Victoria Wheat and other varieties of summer wheat, Burt, Smyrna and New Zealand Oats, and improved varieties of Rice.

2. *Oil Seeds.*—Linseed, Castor Oil, annual and perennial, Sunflower, black Russian, and Ground-nut varieties.

3. *Leguminous Crops.*—Velvet Beans, Dhal and Cow Peas.

4. *Hay Crops.*—German Millet, Boer Manna and Teff Grass.

5. *Root Crops.*—Mangel, Carrots and Cattle Radish.

6. *Fibre Crops.*—Hemp, Jute, Mauritius Hemp, Ramie and Sunn Hemp.

7. *Miscellaneous Crops.*—Japanese Buckwheat, Majorda Melon, Rape and Cattle Kale.

8. *Pasture Plants and Grasses.*—Napier's Fodder slips, Paspalum, Sheep's Burnet and Beggar Weed (legume).

Forestry—Sale of Trees

The undermentioned varieties of trees will be available for sale from December onwards.

Price, f.o.r. Salisbury, 1d. each, 8s. 4d. per 100.

The following reductions are made on large orders on condition that the tins are returned. Otherwise they will be charged up at 3d. per tin:—

£3 per 1,000. £2 10s. per 1,000 for orders of over 5,000.
Average height of trees—3 to 9 inches.
Average number in tin—25.
Average weight of tin—25 lbs.

Belhambra.
Callitris calcarata—Cypress pine.
do. robusta—Murray pine.
Casuarina leptoclada—Beefwood.
Cedrela toona—Toona.
Cupressus arizonica.
do. sempervirens, var. pyramidalis—Churchyard cypress.
do. sempervirens, var. horizontalis — Common cypress.
do. torulosa—Himalayan cypress.
Dalbergia sissoo—Sissoo.
Eucalyptus amygdalina—Peppermint gum.
do. botryoides.
do. calophylla—White flowering gum.
do. citriodora—Lemon-scented gum.
do. corynocalyx—Sugar gum.
do. crebra—Ironbark.
do. leucoxylon.
do. longifolia.
do. melliodora—Grey box gum.
do. microtheca—Coolibah gum.
do. paniculata—Ironbark.
do. robusta.
do. rostrata—Red gum.
do. saligna.
do. salmonophloia.
do. maculata.

Eucalyptus siderophloia.
do. sieberiana.
Jacaranda.
Pinus halepensis—Aleppo pine.
do. longifolia—Chir pine.
Tristania conferta.
Thuya orientalis—Arbor vitæ.
Croton sylvaticus.
Weeping willow.
Lagonaria.
Dodonea viscosa.
Grevillea robusta—Silver oak.
Schinus molle—Pepper tree.

Also in stock larger trees at 3d. each; average height of tree, 9 inches to 2 feet 6 inches; average weight of tins, 25 lbs.; number in tin, 4.

Fourcroya gigantea (Mauritius hemp), 1s. per 100.
Agave sisilana (Sisal hemp), 3s. per 100.
Paspalum, 5s. per 1,000 rooted slips.

Shrubs for Sale

Price, f.o.r. Salisbury, 6d. each. There is no guarantee to have any particular variety of shrub in stock, but everything possible will be done to supply the demand. Most of them are planted four in a tin, but there is usually a fair stock of single tins.

Red.

	Approx. height of growth.
Holmskioldia	8 ft.
Habrothamnos	5 ft.
Tecoma capensis	6 ft.
Hibiscus, single	8 ft.
do. double	8 ft.
Bottle brush	10 ft.
Russellia	3 ft.
Pomegranate	8 ft.
Bauhinia	8 ft.
Euphorbia jacquiniflora	4 ft.

	Approx. height of growth.
Plumieria (Frangipane)	8 ft.
Salvia	3 ft.
Cape May	3 ft.
Homelia patens	3 ft.
Bougainvillea	
Poinsettia	
do. double red	
Acalypha	

Pink.

Mallow	3 ft.
Lagerstrœmia flosregina	10 ft.
Alamanda	6 ft.
Sensitive plant	1 ft.

Blue.

Iochroma lanceolatum	10 ft.
Duranta	10 ft.
Plumbago	3 ft.
Heliotrope	3 ft.
Buddleia	6 ft.
Brunfelsia eximia—Natal violet	5 ft.
Rhodesian tree violet—Securidaca	15 ft.
do. lobelia	3 ft.
do. lupin	6 ft.
do. wistaria	20 ft.
Rosemary	

White.

Spirea (Cape May)	4 ft.
Duranta	10 ft.
Lantana bush	8 ft.
Althea, single—"Xmas rose"	5 ft.
do. double	5 ft.
Gardenia	4 ft.
Plumbago	3 ft.
Bauhinia (white and mauve)	8 ft.
Philadelphus	6 ft.
Deutzia	5 ft.
Moon flower	6 ft.
Magnolia	14 ft.

	Approx. height of growth.
Plumieria—Frangipane	8 ft.
Tree lupin	6 ft.
Pittosporum undulatum	7 ft.
Lemon-scented verbena	5 ft.
Rhodesian tree violet	15 ft.

Yellow.

Tecoma Smithii	10 ft.
Thevetia nerifolia	6 ft.
Cape jasmine	10 ft.
do. laburnum	10 ft.
Holmskioldia	10 ft.
Buddleia	10 ft.
Alamanda nerifolia	4 ft.
Streptosolon Jamesonii	3 ft.
Abutilon—"Chinese lantern"	8 ft.
do. —variegated leaf	8 ft.
Poinsettia	8 ft.
Cestrum aurantiacum	5 ft.
Hypericum—St. John's Wurt	4 ft.
Ribes	3 ft.
Naudina domestica	4 ft.
Galphinia nitida	4 ft.
Acacia cultriformis	
Broom	

Maure.

Iochroma	10 ft.
Salvia	2 ft.

Climbers.

Golden shower—Yellow.
Clitoria ternata—mussel shell creeper—Blue.
Potato creeper (Solanum Wenlandii)—Blue.
Phaseolus caracalla—White.
Beaumontia—White.
Jasmine—White.
Podranea—Zimbabwe creeper—Pink.
Dutchman's pipe (Aristolochia sypho).
Jasmine—sweet-scented—White.
do. double—Yellow.
Ivy.

Applications together with remittances and full particulars regarding forwarding should be addressed to the Government Agriculturist and Botanist, Department of Agriculture, Salisbury.

Poisonous Plants

It is of great importance that as soon as possible a study should be made of those plants found in Southern Rhodesia which are poisonous or deleterious to small or large stock. Farmers and others who have known, or suspected poisonous plants on their property, are requested to communicate with the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, at the same time forwarding specimens of the plant, including stem, leaves, flowers, and, where possible, fruit. Any particular regarding the habits of the plant will be welcomed, and in return the Department will supply all available information regarding the plants.

Live Stock

The Animal Industry Branch is prepared to advise with regard to all matters connected with stock breeding, selection, feeding and registration of stud animals, the dairy industry, poultry management, farm buildings for stock, and kindred subjects. Buyers and sellers of stud stock in Rhodesia are also put in touch with one another.

Entomology

The Government Entomologist advises on matters connected with insect pests of live stock, crops, and fruit trees, and also undertakes the inspection of nurseries and of the importation of plants from abroad.

Chemical Analyses

The Government Agricultural Chemist deals with matters relating to the composition of soils, fertilisers, farm produce of vegetable or animal origin; also the investigation of poisons and of articles of potential economic value.

Nominal charges are made, which, while not covering the cost, will help to defray the expense and serve as a proof of good faith. Samples, carriage prepaid, together with full particulars regarding the subject should be addressed to the Agricultural Chemist, Department of Agriculture, Salisbury.

A schedule of charges and directions for taking samples will be furnished on application.

With all analyses, reports will be furnished explanatory of the results and, when possible, advice given as to the nature, properties and value of the material.

No charge will be made for analysis where the material forwarded is considered by the Director of Agriculture and Chemist to be of sufficient general interest.

Citrus Culture

The Government Citrus Adviser advises on all matters connected with the citrus and deciduous fruit industry.

Services of Government Veterinary Surgeons

1. The services of Government Veterinary Surgeons are available to the public, free of charge, for the following purposes only :—

(1) Attending and giving professional advice in connection with the following diseases, viz. :—Anthrax, Contagious abortion, East Coast Fever, Epizootic Lymphangitis, Foot and Mouth Disease, Farcy, Foot-rot, Heartwater, Glanders, Intestinal parasites amongst sheep and goats, Liver Disease, Lungsickness, Osteo Porosis, Malarial Catarrhal Fever (blue tongue), Rabies, Redwater, Rinderpest, Scabies, Sponziekte (quarter evil), Swine Fever, and any other diseases which may in future be scheduled in terms of section 3, sub-section 18 of the "Animals Diseases Consolidation Ordinance, 1906." Attending to cases of disease amongst live stock which, though not of a contagious or infectious character, may be of general public importance.

(2) Applying tests in regard to Glanders, Tuberculosis, or any other disease against the introduction or spread of which tests are applied under regulations.

(3) Inoculations against the following diseases :—

Horsesickness, Lungsickness, Anthrax, Quarter Evil, Redwater, Malarial Catarrhal Fever (blue tongue). A fee to cover the cost of serum and virus will be charged.

2. The following charges shall be made and payable for services rendered by the Government Veterinary Surgeons in other cases, viz. :—

	£	s.	d.
(1) For every professional visit within three miles of his office or residence	0	5	0
(2) For every professional visit beyond such distance	0	10	6
plus an additional charge of 2/6 per hour whilst engaged in such visits or £2/2/0 a day of 24 hours;			
(3) For advice given at the Veterinary Surgeon's office, for each animal, per visit	0	2	6
(4) The following to be charged in addition to visiting fees :—			
a. For every examination as to soundness, each	1	1	0
b. For castration, horses, each	1	1	0
c. For castration, bulls, each	0	5	0
d. For castration, donkeys, each.. ...	0	10	6
e. For parturition cases, mares, each	2	2	0
f. For parturition cases, cows, each..	1	1	0
g. For other operations, according to nature, from 5/- to £2/2/0.			

3. Double the above fees will be payable for services rendered on Sundays, public holidays, and between the hours of 7 p.m. and 7 a.m.

4. Applicants for the services of Government Veterinary Surgeons must at their own cost provide the necessary transport for the conveyance of these officers from, and back to, their residence or nearest railway station.

5. Farmers and owners of stock throughout the country frequently telegraph for a Government Veterinary Surgeon to be sent to attend an animal which has been taken seriously ill. It is rarely possible to comply with these requests at once, as the Veterinary Surgeon may be engaged on duty which he cannot leave, or is at such a distance from where his services are required that he can hardly be expected to arrive in time to be of any service in an urgent case. Hence much valuable time is wasted, the owner of the animal is dissatisfied, and the veterinary staff discredited. To obviate this, in all cases where veterinary advice and assistance are required, the owner should telegraph to "Veteran," Salisbury, with prepaid reply, the nature of the complaint that the animal is suffering from, giving as full and accurate a description of the symptoms as possible. This will enable the Chief Veterinary Surgeon to telegraph advice at once and state whether he is able to arrange for veterinary attendance on the case or not, and save valuable time, which is always of importance in acute cases.

6. The services of Government Veterinary Surgeons will only be available for private work with the consent of such officers, and when such work does not interfere with their official duties, or when the services of a private practitioner are not available.

7. As the arrangement of allowing Government Veterinary Surgeons to attend to private cases is intended purely for the benefit of farmers and stock-owners who may wish to obtain professional advice, no responsibility whatever will be accepted for any loss of stock, etc., which may result from the negligent treatment or advice, or wilful default, of any Government Veterinary Surgeon.

8. All fees collected in terms of these Regulations are payable to the Treasury through the local Receiver of Revenue.

Irrigation

From the Agricultural Engineer assistance may be obtained by farmers for the following :—

1. In the locating of possible irrigation projects.
2. In the preparation of surveys or plans and for irrigation works, including weirs, dams, furrows, pumping

plants, and determining the extent of land which may be brought under irrigation schemes, together with rough estimates of costs.

3. In the supervision of construction and carrying out of projects.
4. In the selection of suitable sites for boring operations.
5. Preparing specifications, etc., regarding pumping plants, windmills, and agricultural machinery.
6. Giving general advice on cognate subjects.

Informal advice of a general character will be given to applicants making enquiry by letter or in person. Any applicant desiring professional assistance likely to occupy more than one day should apply for advice in writing. All applicants should specify clearly the nature of the project on which they seek advice, and should give full particulars as to the distance and direction of their farms from some well-known centre. Applicants will be required to provide suitable means of transport for the officer concerned during the period devoted to work on the spot; to provide any unskilled labour that may be required; and to provide for any other contingent services. Applications should be addressed to the Director of Agriculture, who will endeavour to arrange visits as far as possible in order of application, but with due regard to situation, in order to obviate unnecessary travelling and delay. The services of the Agricultural Engineer are given free, but in cases demanding prolonged individual attention, or repeated supervision, a charge may be made according to circumstances.

Samples

In connection with enquiries, especially with regard to diseases amongst crops, insect pests, soils, grain and the identification of plants, specimens should, wherever possible, be sent, together with full details. It is found that such parcels are often forwarded without any indication of where they are from or why they were sent and it is difficult in such cases to trace the sender. It is, therefore, requested that persons when forwarding samples for examination, indicate clearly their names and address on the package, so as to enable their requirements to be attended to without delay.

The Analysis of Agricultural Products, Soils, Water, etc.

SCALE OF CHARGES.

Arrangements have now been made for the chemical examination of soils, grain, and other produce, oil-seeds, milk, water, fertilisers, etc., on behalf of farmers and others by the Chemist attached to the Department of Agriculture. The charges made, while not covering the cost, will help to defray the expense and serve as a proof of good faith. Samples, carriage prepaid, together with full particulars regarding the subject, should be addressed to the Agricultural Chemist, Department of Agriculture, Salisbury.

Schedule of Charges.

	£	s.	d.
1. Partial analysis of a manure or feeding stuff, for each constituent	0	5	0
2. Complete analysis and valuation of a manure or feeding stuff	1	0	0
3. Analysis of agricultural products, *e.g.*, grain, hay, roots, etc.	1	0	0
4. Analysis of water for agricultural purposes, irrigation or drainage	1	5	0
5. Partial analysis of soil to determine fertility and recommendations as to manurial treatment	2	0	0
6. Complete analysis of a soil	3	0	0
7. Milk—determination of total fat and solids ...	0	5	0
do. do. of fat only	0	2	6
do. complete analysis	0	10	0
8. Cream—determination of fat only	0	2	6
do. complete analysis	0	10	0
9. Analysis of cheese	0	10	0
10. Limestone estimation of percentage of lime	0	5	0
do. complete analysis	1	0	0

Remittances should accompany samples submitted.

No charge will be made where the material forwarded is considered by the Director of Agriculture and Chemist to be of sufficient general interest.

Directions for Taking Samples of Soils.

It is recommended to select four or five spots at least, per acre, taking care that these represent as far as possible the general character of the soil of the field. If the soil of the area to be reported upon presents notable differences, the samples gathered from the different parts must be kept separate.

Having selected a proper spot, pull up the plants growing upon it and remove surface accumulations of decaying leaves, etc., if any. Dig a hole about twelve inches deep and trim one side so as to be smooth and vertical; from the side so prepared remove with the aid of a sharp spade a slice of uniform thickness—about three or four inches—down to a depth of nine inches. Place the slice on a clean board or cloth and mix thoroughly with similar slices obtained in the same way from other parts of the field area. About six pounds of the mixture are then placed in a clean cloth bag or wooden box. Forward with the sample the following particulars:—

Date of collection, exact location, position (hillside, vlei or flat), peculiarities of soil or sub-soil, behaviour in wet and dry seasons, crops borne, previous manurial treatment, and every circumstance in fact which will throw light on its agricultural qualities.

Directions for Taking Samples of Grains, Produce and Feeding Stuffs.

Grains, meal and feeding stuffs and all agricultural produce should be sampled in the same manner as prescribed for fertilisers.

When the feeding stuff is in the state of cake, select not less than three cakes where the quantity does not exceed one ton, not less than five cakes when the quantity does not exceed five tons, and not less than ten cakes when the quantity exceeds five tons.

Break the selected cakes into small pieces, mix them together, and take the sample—not less than one pound—from the mixture.

Directions for Taking Samples of Fertilisers.

If delivered in bags, select not less than two bags when the quantity does not exceed one ton, and one additional bag for every additional ton.

In no case need more than ten bags be selected.

Empty the selected bags separately on to a clean wooden or stone floor. Thoroughly mix the contents, and set aside one spadeful from each bag, mix together the separate spadefuls, and from the mixture take about one pound as a sample.

If the fertiliser is in bulk, mix together portions taken from the different parts, and draw the sample from the mixture.

Directions for Taking Samples of Water.

All samples should be sent in glass bottles. Stoneware jars are to be avoided. The bottles should preferably be provided with glass stoppers; if corks are used, they must be new and well washed previously in pure water.

In sampling a stream or tank, before taking the samples rinse out the bottle several times with water, taking care to avoid the introduction of mud or sediment.

Before taking a sample of water from a pipe, allow the water to run through it for a few minutes at full pressure.

In all cases, before the sample is taken, always rinse out the bottle several times with the water to be sampled.

Quantity to be taken: 1 gallon.

Directions for Taking Samples of Milk and Cream for Butter-Fat Determinations.

The bulk from which the sample is to be drawn should be first poured two or three times from one vessel to another, and about half-a-pint forwarded for examination.

If it is impossible to deliver the sample in a fresh condition, introduce into each sample bottle about as much of the following preservatives as can be held upon a threepenny piece:—Borax, boric acid or salicylic acid; stating which preservative has been used.

All bottles used must have been previously cleansed with boiling water.

Charges for Dipping Cattle at Government Dipping Tanks.

A charge of 1d. per head is made in respect of all cattle dipped at Government dipping tanks.

Unweaned calves will be dipped free of charge.

Payment may be made in cash or by means of books of coupons at £1, 10/- and 2/6, which can be obtained from Civil Commissioners, Native Commissioners, or through all Veterinary Surgeons and Cattle Inspectors.

The tanks to which these provisions at present apply are the following :—

Salisbury (3), Bulawayo (3), Inyati, Umtali, Penhalonga, Melsetter, Marandellas, Macheke, Mazoe, Lomagundi, Hartley, Gwelo, Selukwe, Enkeldoorn, Victoria, Gwanda, Gatooma, Que Que, Umvuma, Kimberley Reefs.

Lectures for Farmers

The services of certain of the officers of the Department of Agriculture and the Veterinary Department are available for purposes of delivering lectures on subjects upon which they have special knowledge. As far as practicable, lectures will be accompanied by demonstrations at the time or subsequently in the field. Owing to the many calls on the time of the staff and the exigencies of their duties, alternative dates are desirable in order to avoid disappointment. The following topics are offered as examples of subjects that may be dealt with in this manner, but the suggestion of other themes is invited.

Agriculture.—Maize growing; Maize selection and maintenance of the breeding plot; Points of maize and maize judging, with demonstrations; Utilisation of granite vlei soils; Ground nut culture; Rotation crops for home use and for sale; Veld improvement by winter grasses; Production of foodstuffs for the mines; Ensilage; Fungoid diseases of maize and wheat; Wheat, oats and lucerne under irrigation; The prospects of cotton culture in Southern Rhodesia.

Veterinary Hygiene.—Detection and prevention of disease; The care of live stock.

Live Stock.—Judging of cattle according to breeds, and for beef, milk and draught; feeding and kraaling of live stock; general principles of cattle breeding; management of imported stock; grading up of native or local stock with pure bred bulls.

Dairying.—Home butter-making; building and equipment of a farm dairy; handling and marketing of milk; packing and marketing of butter; construction of cow houses.

Swine Husbandry.—Breeding and feeding of swine; some suggestions for the production of first-class bacon pigs; construction of piggeries at moderate cost.

Chemistry.—The principles of soil fertility; the principles of manuring; the value of lime in agriculture; chemistry of milk and its products (accompanied by demonstrations in milk-testing).

Entomology.—Economic entomology on the farm; the role of insects and their allies in the transmission of disease; scale insects and fruit trees and methods for their control; insect pests and maize; enemies of the potato, insect and fungus; the value and objects of plant import and nursery regulations.

Irrigation.—Methods of applying water to land for irrigation; the measurement of water in connection with irrigation; canal irrigation; storage reservoirs; hints on the selection of sites and on the design of earthen and other dams; irrigation by pumping, with notes on the selection of plants.

Enquiries and invitations should in the first instance be addressed to the Director of Agriculture, Salisbury.

Departmental Bulletins.

The following Bulletins, consisting of reprints of articles which have appeared in this Journal, are available for distribution free of charge to applicants in Southern Rhodesia only:—

AGRICULTURE.

No. 61. Requirements in sending Botanical Specimens to the Department for Identification.

No. 62. Services of Agricultural Engineer.

No. 64. Hints on Irrigation—Small Gravitation Schemes, by W. M. Watt.

No. 81. Possibilities of Export Trade in Oil Seeds, by H. Godfrey Mundy, F.L.S.

No. 90. Reports on Experiments—Experimental Station, Salisbury, 1910-1911, by J. H. Hampton.

No. 94. Second Report on Experiments, by J. H. Hampton.

No. 125. Subterranean Water, by W. M. Watt.

No. 155. The Manuring of Maize on the Government Experimental Farm, Gwebi, 1912-13.

No. 160. Hints on Irrigation—Pumping Plants, by W. M. Watt, Agricultural Engineer.

No. 177. Notes on the Raising of Seedling Trees, by F. B. Willoughby.

No. 189. The Manuring of Maize on the Government Experiment Farm, Gwebi, by G. N. Blackshaw, B.Sc., F.C.S.

No. 192. A Calendar of Crop Sowings, by H. Godfrey Mundy, F.L.S.

No. 203. Ensilage, by J. A. T. Walters, B.A., and The Feeding of Ensilage to Dairy Cattle in Winter, by R. C. Simmons.

No. 206. Hints on Irrigation: Small Earthen Storage Reservoirs, by W. M. Watt.

No. 212. Citrus Fruits in Rhodesia, by A. G. Turner.

No. 216. Manuring of Maize on Government Experiment Farm, Gwebi, by A. G. Holborow, F.I.C.

No. 218. Useful Measurements of Maize, by J. A. T. Walters, B.A.

No. 220. Reports on Crop Experiments, Gwebi, 1914-15, by E. A. Nobbs, Ph.D., B.Sc.

No. 221. Results of Experiments, Longila, 1914-15, by J. Muirhead.

No. 222. Costs of Farm Operations, Gwebi.

No. 300. The Dangers and Prevention of Soil Erosion, by W. M. Watt.

Tree Culture in Southern Rhodesia, by P. B. S. Wrey, A.M.I.C.E.

CROPS.

No. 88. Chicory Growing, by H. Godfrey Mundy, F.L.S.

No. 106. Cultivation and Preparation of Ginger.

No. 126. Turkish Tobacco.

No. 132. Sumatra Tobacco, Hints to Rhodesian Growers, by C. J. Sketchley.

No. 138. **Tobacco Culture (Virginia)—Harvesting and Curing.**

No. 162. Rhodesian Maize: The Principal Types and their Points, by J. A. T. Walters, B.A., Assistant Agriculturist.

No. 170. Production of Pedigree Seed—Maize, by H. Godfrey Mundy, F.L.S.

No. 174. Notes on Hop Growing, by H. Godfrey Mundy, F.L.S.

No. 175. Notes on Lucerne, by H. Godfrey Mundy, F.L.S.

No. 176. The Cultivation of Castor Oil Beans, by H. Godfrey Mundy, F.L.S.

No. 179. Buckwheat, by H. G. Mundy, F.L.S.

No. 181. Sunflower Cultivation, by H. G. Mundy, F.L.S.

No. 188. The Ground-Nut or Monkey Nut, by H. Godfrey Mundy, F.L.S.

No. 193. Oats in Southern Rhodesia, by H. Godfrey Mundy, F.L.S.

No. 194. Rye, by J. A. T. Walters, B.A.

No. 201. Dhal or Pigeon-Pea, by J. A. T. Walters, B.A.

No. 207. Crop Rotation in Southern Rhodesia, by J. A. T. Walters, B.A.

No. 225. Napier Fodder or Elephant Grass, by J. A. T. Walters, B.A.

No. 232. Witch-Weed or Rooi-Bloem, by J. A. T. Walters, B.A.

No. 235. Crops Unsuitable to Southern Rhodesian Conditions, by J. A. T. Walters, B.A.

ENTOMOLOGY AND VEGETABLE PATHOLOGY.

No. 43. Citrus Psylla.

No. 75. Fumigation of Fruit Trees with Hydrocyanic Acid Gas, by R. W. Jack, F.E.S.

No. 139. Termites, or "White Ants," by Rupert W. Jack, F.E.S.

No. 140. Insect Pests of Tobacco in Southern Rhodesia, by R. W. Jack, F.E.S.

No. 142. The Bean Stem Maggot, by R. W. Jack, F.E.S.

No. 147. Root Gallworn, by R. W. Jack, F.E.S.

No. 148. Darkling Beetle Grubs Injurious to Tobacco, by R. W. Jack, F.E.S.

No. 151. Potato Spraying Experiments for the Control of Early Blight, by Rupert W. Jack, F.E.S.

No. 154. Borers in Native Timber—Results of Experiments with Preservatives, by Rupert W. Jack, F.E.S.

No. 158. Two Ladybirds Injurious to Potato Plants, by R. W. Jack, F.E.S.

No. 171. The Cabbage Web-Worm—A Pest of Cabbage and Allied Plants, by R. W. Jack, F.E.S.

No. 172. Diseases of the Potato Tuber and the Selection of Sound Seed, by R. W. Jack, F.E.S.

No. 178. Illustrations of Natural Forest in relation to Tsetse Fly, by R. W. Jack, F.E.S.

No. 187. The Dusty Surface Beetle, by Rupert W. Jack, F.E.S.

No. 197. Chafer Beetles, by R. W. Jack, F.E.S.

No. 204. Some Injurious Caterpillars, by R. W. Jack, F.E.S.

No. 214. Some Household Insects, by R. Lowe Thompson, B.A.

No. 219. More Household Insects, by R. Lowe Thompson, B.A.

No. 228. Rhodesian Citrus Pests, by R. W. Jack, F.E.S.

No. 233. Does it Pay to Spray Potatoes in Southern Rhodesia? by Rupert W. Jack, F.E.S.

VETERINARY.

No. 50. Epizootic Abortion in Cattle, by Ll. E. W. Bevan, M.R.C.V.S.

No. 51. Strangles, by F. D. Ferguson, M.R.C.V.S.

No. 53. Animals Diseases Consolidation Ordinance, 1904.

No. 65. Common Ailments of the Horse, by D. R. Chatterley, M.R.C.V.S.

No. 84. African Coast Fever—Diagnosis of Gland Puncture, by Ll. E. W. Bevan, M.R.C.V.S.

No. 95. Oestrus-ovis in Sheep, by Alec King.

No. 103. Dipping and Tick-Destroying Agents, by Lt.-Col. H. Watkins-Pitchford.

No. 121. Rabies, by Ll. E. W. Bevan, M.R.C.V.S., and T. G. Millington, M.R.C.V.S., D.V.H.

No. 165. Report of Veterinary Conference, Bulawayo, April, 1913.

No. 180. Note on the Treatment of Biliary Fever of the Horse with Trypan Blue, by Ll. E. W. Bevan, M.R.C.V.S.

No. 191. Scab or Scabies in Sheep and Goats, by Rowland Williams, M.R.C.V.S.

No. 195. Some Notes on the Systematic Dipping of Stock, by C. R. Edmonds, Assistant Chief Veterinary Surgeon, and Ll. E. W. Bevan, Government Veterinary Bacteriologist, Southern Rhodesia.

No. 202. Distomatosis or Liver Fluke in Cattle and Sheep, by Rowland Williams, M.R.C.V.S.

No. 215. African Coast Fever, by Ll. E. W. Bevan, M.R.C.V.S.

No. 223. A Note on Contagious Abortion, by Ll. E. W. Bevan, Government Veterinary Bacteriologist.

LIVE STOCK.

No. 96. Swine Breeds and Breeding of, by Loudon M. Douglas, F.R.S.E.

No. 101. Hints to Dairy Farmers, by J. C. Jesser Coope, F.C.S., N.D.D.

No. 145. Prospects for Importation of Cattle from Australia, by Eric A. Nobbs, Ph.D., B.Sc.

No. 161. Notes on Cattle Breeding, Part III., by R. C. Simmons.

No. 167. The Construction of Dipping Tanks for Cattle.

No. 190. The Principle of the Winter Feeding of Dairy Cattle, by R. C. Simmons.

No. 208. Water in the Diet of Live Stock, by Ll. E. W. Bevan, M.R.C.V.S.

No. 210. The Care and Feeding of Calves in Dairy and Stud Herds, by R. C. Simmons.

No. 211. The Fattening of Pigs on Granite Farms in Mashonaland, by R. C. Simmons.

No. 227. An Experiment in Beef Production, by R. C. Simmons.

No. 229. Breeding and Feeding of Pigs for Bacon Factory Purposes, by R. C. Simmons.

MISCELLANEOUS.

No. 93. Formation of Agricultural Credit Associations in Rhodesia, by Loudon M. Douglas, F.R.S.E.

No. 119. Some Notes on Charcoal Burning, by Eric A. Nobbs, Ph.D., B.Sc.

No. 129. How to Make Use of the "Fencing Ordinance, 1904," by N. H. Chataway.

No. 134. Plans and Specifications for Flue Curing Tobacco Barns.

No. 144. Rhodesian Tobacco—Prospects of an Australian Market, by Eric A. Nobbs, Ph.D., B.Sc.

No. 152. A School of Agriculture for Southern Rhodesia, by Eric A. Nobbs, Ph.D., B.Sc., Director of Agriculture.

No. 157. Hints on Brickmaking, by G. T. Dyke.

No. 168. Report on the Methods of Growing, Curing and Selling Bright Tobacco in Virginia, U.S.A., by H. Kay Scorror.

No. 183. The Rainy Season in Southern Rhodesia, by the Rev. E. Goetz, S.J.

No. 184 Cream—Its Separation, Handling and Sale to Butter Factories, by R. C. Simmons.

No. 186. Concrete and Reinforced Concrete, by E. Hardcastle, M.I.E.E.

No. 196. Collection of Agricultural Statistics in Southern Rhodesia, by Eric A. Nobbs, Ph.D., B.Sc.

No. 198. Poultry Keeping for the Rhodesian Farmer, by Frank Sheppard.

No. 199. Eucalypts for the Farm, by J. J. Boocock.

No. 205. Home Butter Making, by R. C. Simmons.

No. 209. The Agricultural Returns for 1914, by B. Haslewood, F.S.S.

No. 213. Hydraulic Rams, by W. Martin Watt.

No. 217. Windbreaks and Hedges, by F. B. Willoughby.

No. 224. Statistical Returns of Crops, 1914-15, by E. A. Nobbs, Ph.D., B.Sc., and B. Haslewood, F.S.S.

No. 226. Classification of Clouds.

No. 230. Farm and Live Stock Statistics, 1915, by Eric A. Nobbs, Ph.D., B.Sc., and B. Haslewood, F.S.S.

No. 231. Estimates of Maize and Tobacco Crops, 1915-16, by Eric A. Nobbs, Ph.D., B.Sc., and B. Haslewood, F.S.S.

No. 234. Eucalypts suitable to Southern Rhodesia, and how to Grow them, by F. B. Willoughby.

No. 236. Notes on Propagation by Means of Cuttings in Rhodesia, by F. B. Willoughby.

No. 237. The Analysis of Agricultural Products, Soils, Water, etc.

Malarial Fever : How it is caused and how it may be prevented, by Sir Ronald Ross, F.R.C.S., D.Sc., LL.D., F.R.S., K.C.B., etc.

Malaria : its History, Prevention and Cure, by A. M. Fleming, C.M.G., M.B., F.R.C.S. (Ed.), D.P.H. (Camb.), Medical Director.

Game Law : Summary of.

Terms for Analysis by the Department of Agriculture, of Produce, Soils, Water, etc

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HANDBOOK OF TOBACCO CULTURE for Planters in Southern Rhodesia. Sold by the Department of Agriculture. 2/6.

Employment on Farms.

The Department of Agriculture receives numerous enquiries from persons of varied attainments, age and financial position for openings on farms, as managers, assistants and learners, requiring remuneration on corresponding scales, or willing to give services in return for keep.

In order that work may be found for the above and needs of farmers met, applications are invited from both employers and persons seeking employment. Applications are also invited from artisans, such as masons, bricklayers, carpenters, fencers, well sinkers, concrete workers, and the like who may desire work on farms. In cases where employers have obtained the labour they require, or applicants for employment have found work, it is requested that notification be at once sent to the Department of Agriculture, in order that unnecessary correspondence be avoided.

Replies to the following applications should be addressed to the initials of the advertisers, c/o Director of Agriculture, who will forward the letter to the party referred to.

Note.—The following advertisements will not be repeated unless the advertisers inform us they wish them to be continued:—

SITUATIONS VACANT.

R. D. G.—Vacancy for a reliable and companionable farm pupil.

A. G. V.—Wants crop partner to work with owner. Each to contribute shares of implements, labour, also draught cattle if necessary, and to share crops.

SITUATIONS WANTED.

A. T. P. As learner; strong, intelligent, willing; will work in any capacity.

W. W. C.—Wants employment on ranch; married; good references.

R. E.—Seeks engagement to take charge of farm. Good milker and cowman, used to heavy milkers; poultry man and gardener; Rhodesian experience; references.

J. W.—Strong youth of 16 years wants situation on farm as learner.

A. W. H. P.—Would take salary or shares. Knowledge of general farming and market gardening. Total abstainer.

Government Notices.

No. 50 of 1912.] [8th February, 1912.

(As amended by Nos. 329 and 383 of 1914.)

AFRICAN COAST FEVER.

Regulations regarding the movement of cattle and the prevention and suppression of disease.

1. UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw Government Notices Nos. 329 of 1910 and 308 of 1911 and make the following provisions in lieu thereof :—

2. The various districts of Southern Rhodesia are hereby declared an area infected with African Coast Fever for the purposes of section 5 (2) of the aforesaid Ordinance, and, save as hereinafter set out, all movement of cattle within the said districts is prohibited until further notice.

General Movement.

3. For the purpose of section 22 (1) of the said Ordinance, the following shall be regarded as places within the boundaries of which the movement of cattle may be allowed without special permission :—

(a) Single farm.

(b) An area occupied by an owner or lessee, under one management, comprising contiguous farms and situated within one cattle transport area. The mere possession by an owner or lessee of grazing rights over a contiguous farm or farms shall not constitute occupation of such farm or farms.

(c) An area the property of one owner.

(d) For grazing purposes, an area within a radius of four miles of native kraals situated on unalienated land or in reserves, save and in so far as such area includes any private land.

The sites of such kraals shall be deemed to be the places where they are situated at the date of promulgation of these regulations.

(e) An area under the management or control of any Municipality, Sanitary Board or Village Management Board.

4. Notwithstanding the provisions of the last preceding section, or of section 9 hereof, the Chief Inspector may, on the outbreak of disease, or for such other cause as may be deemed expedient, direct the isolation or quarantine of cattle on a limited area of the aforesaid places.

5. The movement of cattle from place to place may be permitted under the special permission, in writing, of an Inspector, Sub-Inspector, or other officer or person duly authorised by the Administrator to grant such permission.

6. No permission as aforesaid shall permit the movement of cattle

(a) Without the written consent of the owners, occupiers or managers of occupied land, and in the case of native reserves, of the Native Commissioner of the district over which land or reserve such

cattle will pass, whether along roads or otherwise; provided, however, that refusal to grant such consent shall be in writing, and provided further that if the Controller of Stock or the Chief Inspector shall consider that such consent is withheld without good and sufficient cause he may permit of movement without such consent.

If any such person mentioned above refuse to give consent or to state a reason for refusing to do so in writing, no valid objection shall be deemed to exist and movement may be permitted without such written consent.

(b) Within a veterinary district as defined in the Schedule annexed hereto from one transport area to or through another without the consent of the Cattle Inspector in charge of such area.

(c) From any veterinary district to or through another without the consent of the District Veterinary Surgeon of such district.

Slaughter Cattle.

7. Cattle moved to any centre for slaughter under the provisions of these or any other regulations shall, on arrival, be immediately taken to such quarantine area (if any) as is provided for the purpose and immediately branded with the letters "V.D." on the near hip.

8. Cattle admitted to a quarantine area in terms of the last preceding section shall be slaughtered within twenty-one days of the date of admission, and shall not be permitted to leave the same except for the purpose of being slaughtered at the appointed abattoir, and if found outside such area, except for the said purpose, may be destroyed on the order of the Chief Inspector or Controller of Stock; provided, however, that the Chief Inspector may allow the removal of cattle from such an area under such conditions as he may prescribe.

Transport Cattle.

9. The use of cattle for draught purposes is prohibited except :—

(1) Within the boundaries of the places defined in section 3 (a), (b) and (c) hereof.

(2) Within the boundaries of areas already fixed for the use of cattle for draught purposes in terms of regulations published under Government Notice No. 329 of 1910, or such other areas as may be fixed by the Administrator.

10. Notwithstanding the provisions of section 9, no permit shall authorise the working of cattle

(a) which are not clearly and distinctly branded with the registered brand of the owner;

(b) in any wagon or vehicle which shall not have the owner's name and address legibly and permanently inscribed on the right side thereof.

11. No wagon or other vehicle drawn by oxen shall be moved from one cattle transport area into another without the permission of the Cattle Inspectors concerned, and under such conditions as they may impose.

General Provisions.

12. On the outbreak or suspected outbreak of disease, the Administrator may declare an area of infection around and embracing the place of outbreak or suspected outbreak, and a further area or areas around such area of infection as a guard area, whereupon all movement of cattle into and from place to place within such area or areas shall be immediately suspended, except as hereinafter provided.

A.—*In areas of infection and guard areas:—*

(1) Cattle in transit by rail may be moved through such area.

(2) Cattle from beyond the borders of Southern Rhodesia may be detrained within such area or areas *en route* to destination.

(3) Cattle for *bona fide* farming, dairy and slaughter purposes may be moved into such area or areas by permission of the Chief Inspector and under such conditions as he may impose.

B.—*In guard areas only:—*

Cattle may be moved into and from place to place within such area under the conditions of section 6 hereof.

13. The removal of green forage, hay, fodder, bedding reeds, manure or of such other articles as may be reasonably supposed capable of conveying infection, shall be prohibited from areas of infection, save and except with the special permission of the Administrator.

14. Whenever an area shall have been declared under section 12 hereof, every person within such area, or within such further area as may be specified by Government Notice, owning or in charge of cattle shall, upon the death or slaughter because of disease, suspected disease, or accident, of any such cattle, immediately report such occurrence through the nearest Cattle Inspector, Native Commissioner or Police Officer to the District Veterinary Surgeon.

15. Notwithstanding the provisions of these regulations, it shall be competent for the Chief Inspector of Cattle to authorise and direct the movement of cattle for the purposes of isolating, dipping, quarantine, or any other such objects as may be deemed necessary to prevent or suppress an outbreak of disease.

16. Whenever an area shall have been declared an area of infection or guard area in terms of section 12 hereof, any person who shall allow any cattle to stray or be otherwise removed, except as provided for in these regulations, from any one place within such area to another place, or from a place outside of to a place within such area, shall be guilty of an offence against these regulations.

17. All cattle within the limits of the various commonages and townlands, areas of infection and guard areas as declared under section 12 hereof, or depastured on common grazing ground, shall be dipped or sprayed at least once in every three days, unless the Chief Inspector shall authorise the extension of the time between such dipping or spraying, or the entire suspension of the same.

18. In all areas of infection and guard areas sheep and goats shall be dipped at such periods as may be directed by the Chief Inspector.

19. Whenever the owner, occupier, or manager of a farm shall adopt means of cleansing cattle running thereon, either by spraying, dipping, or by any other method, the Chief Inspector may order any natives or other persons having cattle on the same farm to cleanse such cattle, and the Native Commissioner of the district within which the farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed upon between the said owner, occupier or manager and the said native owners.

20. All permits for the removal of cattle issued under the provisions of the said Ordinance or of any regulations framed thereunder shall specify legibly and clearly on the face thereof the place from and to which such cattle may be removed, the route by which they shall travel, the number and brands of such cattle, the time allowed for the journey, and such other particulars and conditions as it may be deemed expedient to provide.

21. No permit issued for the movement of cattle shall be taken to authorise any trespass in connection with such movement.

22. Notwithstanding the provisions of these regulations, it shall not be lawful for any owner of cattle to allow any such cattle to be on any road, public outspan, commonage, or any property other than that of the owner,

unless they are free from ticks or unless they have been effectively cleansed by dipping, spraying or other process, within fourteen days of being allowed on such road or other place. Any beast having ten or more ticks on it shall not be considered free from ticks.

23. Any person contravening the provisions of these regulations or the conditions set out in permits issued thereunder, shall, where no higher penalty has been by the said Ordinance or any other law provided, be liable in respect of each offence to a fine not exceeding £20, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months.

SCHEDULE "A."

Veterinary Districts of Southern Rhodesia.

(1) *Salisbury.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

32. Battlefields; 33. Hartley and Gatooma; 34. Gadzema Station; 35. Makwiro Station; 36. Norton Siding; 37. Hunyani Tank; 38. 1645½ Peg B. & M. & R. Railways; 39. Salisbury A.; 40. Salisbury B.; 41. Salisbury C.; 42. Salisbury D.; 43. Arcturus; 44. Bromley; 45. Marandellas North; 46. Marandellas South; 48. Headlands Station; 49. Junction Mazoe and Lomagundi Railways; 50. 23-Mile Peg, Lomagundi Railway; 51. Passaford Station; 52. 35-Mile Peg, Lomagundi Railway; 53. Gwibi Tank Halt; 54. Banket, Lomagundi; 55. Eldorado, Lomagundi; 56. Selby Siding; 57. Mazoe; and 58. Kimberley Reefs.

(2) *Bulawayo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

1. Plumtree; 2. Marula Siding; 3. Figtree; 4. Westacre Junction; 5. Bulawayo Area; 6. Heaney Junction; 7. Bembesi Station; 8. Insiza North; 9. Insiza South; 10. Shangani North; 11. Shangani South; 14. Redbank; 15. Nyamandhlovu Station; 16. Malindi Station; 17. Wankies Area; 18. Matetsi Siding; 19. Matopo Terminus; 20. Sabiwa Siding; 21. Gwanda Station; 22. West Nicholson; 23. Belingwe; 59. Essexvale and Balla Balla Areas; 60. Stanmore Siding Area; 61. Filabusi Area.

(3) *Gwelo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

12. Somabula Siding; 13. Gwelo Station; 24. Selukwe Area; 25. Surprise Area; 26. Indiva Siding; 27. Lalapanzi; 28. Iron Mine Hill Siding; 29. Umvuma Siding; 31. Que Que Station.

(4) *Umtali.*

An area comprising the native districts of Umtali, Melsetter, Makoni and Inyanga.

No. 247 of 1915.] [23rd July, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notices Nos. 526 of 1914, 167, 175 and 179 of 1915, and in terms of section 12 of Government Notice No. 50 of 1912, declare the following to be areas of infection and guard areas :—

2. Umtali Native District.

(b) *Guard Area.*

The farms N'odzi and Nyagari and the Penhalonga Valley.

3. Melsetter Native District.

(a) *Areas of Infection.*

(1) Highlands, Rockwood and Joppa Farms.

(2) Clearwater, Nooitgedacht, Randfontein and Avontuur Farms.

(3) Enhoek, Ravenswood, Roslyn, Woodstock, Landsdown, Heilrand and Kenilworth Farms.

(4) Wolvedraai Farm.

(5) Houtberg Farm.

(6) Springfield Farm.

(b) *Guard Area.*

That portion of the native district of Melsetter south of the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri and the Nayanyadzi River.

No. 253 of 1916.] [21st July, 1916.

AFRICAN COAST FEVER.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Animals Diseases Consolidation Ordinance, 1904," to cancel Government Notice No. 173 of 1916, and, in terms of section 12 of Government Notice No. 50 of 1912, declare the following areas of infection and guard areas in lieu thereof :—

Salisbury and Mazoe Native Districts.

(a) *Areas of Infection.*

1. Epworth, Adelaide and Glenwood farms.

2. Sternblick farm.

3. Bluff Hill farm.

4. Borrowdale Estate, Helenvale, Glen Lorne, Luna, Carrickcreagh and Greystone farms.

5. An area bounded by and including the following farms : Belford Estate, Belford Estate No. 2, Belford Estate North (excluding that portion lying east of the railway), vacant land on which the Jumbo Mine is situated (excluding that portion lying north-east of the fence erected between the farm Whitfield and the railway line), Foyle, Welbeck, 100-acre lots and vacant land, Tjibakwe and Belford Estate No. 3.

(b) *Guard Areas.*

1. An area bounded by and including the following farms : Stamford, Good Hope, Henricksen, Mabelreign and Tynwald.

2. An area bounded by and including the following farms : Naauwplaats, the southern boundary of Belford Estate, Msasa, Great B, Spelonken, Thetford, Balkiza, Willesden, Welston, Teviotdale, Zizalisari Outspan, Avondale, Salisbury Commonage, Hatfield Estate, the eastern boundaries of Glenwood and Adelaide, Ventersburg, Dispute, Donnybrook, Caledonia, Gardiner, Father Hartmann, Chishawasha, The Crag, The Grove, Halstead, Chindamora Reserve, vacant land west of Poorti River, Glenbervie, Maggiesdale, Brundret, Spitzkop, Summerdale, Rockwood, Somerset, Southmoor, Howick Estate, Leeuw's Rust, Klein Kopjes, Oude Kraal and Mooi Leegte.

No. 177 of 1916.] [12th May, 1916.

AFRICAN COAST FEVER.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Animals Diseases Consolidation Ordinance, 1904," to declare, in terms of section 12 of Government Notice No. 50 of 1912, the following area of infection in the native districts of Mtoko, Mrewa and Marandellas :—

Description of Area.

An area bounded by a line drawn from the north-western beacon of Showers, along the western boundary of Showers, Gongwe, Magar, northern and western boundaries of Highlands, north-western and south-western boundaries of Allen, western boundary of Holton Estate, western and southern boundaries of Belmont Outspan, north-western boundary of White Gombola, western boundaries of Bonn, Calne, Wilton, northern and southern boundaries of Delta, and southern boundaries of The Cave and Mere; thence up the Macheke River to the south-western beacon of Monte Cassino; thence along the southern and eastern boundaries of Monte Cassino to its most northern beacon; thence in a direct line to the south-western beacon of Changwe Ranch No. 1; thence along the northern boundary of Fairfield Estate to the Nyagadzi River; thence down this river and the Ruenya River to the eastern boundary of this territory; thence along this boundary in a northerly direction to the Mazoe River; thence up that river to its junction with the Shambara River; thence up that river to Manyeu Mountain; thence in a straight line to the eastern beacon of the Msana Reserve; thence up the Inyagui River to the easterly beacon of Middlesex; thence along the northern boundaries of Middlesex, Kent, Suffolk, Sussex and Rupture and the eastern boundary of Argosy to the point first named.

No. 283 of 1915.] [20th August, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the following area of infection and guard areas :—

(a) *Area of Infection.*

The farm Quagga's Hoek, in the native district of Melsetter.

(b) *Guard Areas.*

(1) That portion of the native district of Melsetter north of and including the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri and the Nyanyadzi River.

(2) That portion of the native district of Umtali lying south of the Impodsi River from its junction with the Odzi River to its junction with the Shetora River, thence up the Shetora River to the farm Butler North and including that farm and Banti North.

No. 394 of 1915.] [29th October, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the following areas of infection :—

(1) Melsetter native district—the farms Rumble Rills, Groenvlei, Cecilton and Quagga's Hoek.

(2) Umtali native district—the farm Penkridge.

No. 66 of 1916.] [25th February, 1916.

AFRICAN COAST FEVER.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Animals Diseases Consolidation Ordinance, 1904," to declare, in terms of section 12 of Government Notice No. 50 of 1912, the following areas of infection in the native district of Melsetter :—

The farms Grass Flats, Moosgwe, Lombard's Rust and Diepfontein.

No. 128 of 1916.] [14th April, 1916.

AFRICAN COAST FEVER.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Animals Diseases Consolidation Ordinance, 1904," to declare, in terms of section 12 of Government Notice No. 50 of 1912, the following areas of infection in the native district of Melsetter :—

The farms Wolverhampton and Johannes Rust.

No. 155 of 1916.] [28th April, 1916.

AFRICAN COAST FEVER.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Animals Diseases Consolidation Ordinance, 1904," to declare, in terms of section 12 of Government Notice No. 50 of 1912, the following areas of infection in the native districts of Umtali and Melsetter :—

The farms Thabanchu and Helvetia.

No. 438 of 1915.] [26th November, 1915.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 12 of Government Notice No. 50 of 1912, declare the farm Ostend, in the native district of Melsetter, to be an area of infection.

No. 213 of 1916.] [9th June, 1916.

AFRICAN COAST FEVER.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Animals Diseases Consolidation Ordinance, 1904," to declare, in terms of section 12 of Government Notice No. 50 of 1912, the following area of infection and guard area :—

GWELO NATIVE DISTRICT.

(a) *Area of Infection.*

Riverbend Farm.

(b) *Guard Area.*

That portion of the native district of Gwelo lying north of the Gwelo River and the Gwelo-Umvuma Railway, excluding the Gwelo Commonage.

No. 275 of 1916.] [28th July, 1916.

AFRICAN COAST FEVER.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Animals Diseases Consolidation Ordinance, 1904," to amend Government Notice No. 213 of 1916, and declare the following area of infection in lieu thereof :—

(a) *Area of Infection.*

An area comprising the following farms : Riverbend, Sunbury, Cross Roads, Wegdraai and Reserve.

No. 214 of 1916.] [9th June, 1916.

AFRICAN COAST FEVER.

WHEREAS there has been an outbreak of destructive disease—to wit, African Coast Fever—on the farm Riverbend, in the native district of Gwelo, His Honour the Administrator in Council has been pleased, under the powers vested in him by the "Animals Diseases Amending Ordinance, 1911," to declare the following area to be actively infected with African Coast Fever for the purposes of the said Ordinance.

Description of Area.

An area comprising the following farms :—Main Belt Block farms east of the Long Valley Spruit, Erin, Doon, Krom River, Clearwater, Northfield, Foxton, Harston, Game Park, Riverdale, Long Valley, Bosch Kloof, Barkly, Turffontein, Cross Roads, Wegdraai, Reserve, Shawlands, Roslin, Loads, Riverbend, Sunbury, Garryowen, Ardpatrick, Woodhouse, Adair, Strathfillan, Headwaters, Bendhu, Mnyami, Hillside, Traveller's Rest, Troy, Barton, Ermelo, Lochiel, Umhlali, Mliza, Que Que Reserve and the British South Africa Company's ground between the rivers Que Que and Bembezaan.

No. 215 of 1916.] [9th June, 1916.

AFRICAN COAST FEVER : COMPULSORY DIPPING OF CATTLE.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 7 of the "Animals Diseases Consolidation Ordinance, 1904," to declare that within the area defined below, on and after date of publication hereof, every owner of cattle shall cause same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from operation of this regulation.

Description of Area.

An area comprising the following farms :—Main Belt Block farms east of the Long Valley Spruit, Erin, Doon, Krom River, Clearwater, Northfield, Foxton, Harston, Game Park, Riverdale, Long Valley, Bosch Kloof, Barkly, Turffontein, Cross Roads, Wegdraai, Reserve, Shawlands, Roslin, Loads, Riverbend, Sunbury, Garryowen, Ardpatrick, Woodhouse, Adair, Strathfillan, Headwaters, Bendhu, Mnyami, Hillside, Traveller's Rest, Troy, Barton, Ermelo, Lochiel, Umhlali, Mliza, Que Que Reserve and the British South Africa Company's ground between the rivers Que Que and Bembezaan.

No. 225 of 1916.] [23rd June, 1916.

AFRICAN COAST FEVER.

WHEREAS there has been an outbreak of destructive disease—to wit, African Coast Fever—at Mrewa's Kraal, in the native district of Mrewa, His Honour the Administrator in Council has been pleased, under the powers vested in him by the "Animals Diseases Amending Ordinance,

1911," to declare the following area to be actively infected with African Coast Fever for the purposes of the said Ordinance.

Description of Area.

That portion of the native district of Mrewa lying south of the main Salisbury-Mtoko road.

No. 226 of 1916.] [23rd June, 1916.

AFRICAN COAST FEVER: COMPULSORY DIPPING OF CATTLE.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 7 of the "Animals Diseases Consolidation Ordinance, 1904," to declare that within the area defined below, on and after date of publication hereof, every owner of cattle shall cause same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from operation of this regulation.

Description of Area.

That portion of the native district of Mrewa lying south of the main Salisbury-Mtoko road.

No. 243 of 1916.] [7th July, 1916.

AFRICAN COAST FEVER.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Animals Diseases Consolidation Ordinance, 1904," to declare, in terms of section 12 of Government Notice No. 50 of 1912, the following areas of infection in the native district of Melsetter:—

The farms Geluk, Morgensen, Jameson and Rocklands.

Ordinance No. 27, 1914.] [Promulgated 24th July, 1914.

AN ORDINANCE to provide for the periodic dipping of cattle and other animals.

BE IT ENACTED by the Administrator of Southern Rhodesia, with the advice and consent of the Legislative Council thereof, as follows:—

1. In the interpretation of this Ordinance, if not inconsistent with the context, the following terms shall have the meaning set opposite to them respectively:—

"owner" shall include—

(1) any person, company, co-partnership or public body in actual occupation of or entitled as owner to occupy any land;

(2) persons holding land from the British South Africa Company by virtue of a right commonly known as a Permit of Occupation;

"dipping tank" shall mean any contrivance for the dipping of animals, and structures incidental thereto, approved by the Administrator;

"dip" shall mean any solution for the dipping of animals approved by the Administrator, and in such strength and purity as he may prescribe;

"compulsory dipping" shall mean the dipping in a dipping tank of cattle and such other animals as may be prescribed by the Administrator in dip, at such intervals as the Administrator may direct;

"area" shall mean each of the several native districts or such other area as the Administrator may from time to time define for the purposes of this Ordinance.

2. If the owners in any area resident in Southern Rhodesia, or in the case of non-resident owners their duly authorised representatives or agents, shall by a majority of votes request the Administrator in writing to bring compulsory dipping into operation, the Administrator may, by notice in the *Gazette*, order compulsory dipping from such date as he may prescribe within the whole or any portion of such area; and if such owners by a like majority shall request the Administrator in writing to suspend compulsory dipping within such area, the Administrator may, by notice in the *Gazette*, suspend it accordingly within the whole or any portion of such area, and for such time as he may deem fit; provided, however, that no requests as aforesaid shall be complied with until the Administrator shall have published notice of his intention to do so in the *Gazette* and one or more newspapers (if any) published or circulating in the said area, at least once a week for three consecutive weeks.

Any person desiring to lodge an objection to the bringing into operation or suspension of compulsory dipping as aforesaid shall do so within six weeks of the last publication of such notice.

3. For the purpose of the last preceding section an owner or his duly authorised representative or agent shall have one vote in respect of an area of land not exceeding sixteen hundred morgen, and two votes in respect of an area exceeding sixteen hundred morgen.

4. The Administrator may, within any area in which compulsory dipping has been ordered, require an owner to construct a dipping tank upon his property.

5. Persons furnishing loans for the purpose of erecting dipping tanks may, with the consent of the owner, cause a notice in writing to be sent to the Registrar of Deeds of the amount due by such owner, and the Registrar shall make an entry thereof in respect of the land affected. Such entry shall constitute a hypothecation of the land, ranking from the date on which the entry was made and for the amount therein stated; provided that the Registrar may pass transfer of land so hypothecated if the transferee agrees in writing that any sums due and unpaid shall remain and be registered as a charge against the said land.

6. When any dipping tank is constructed in an area where compulsory dipping is in force by an owner—

(1) upon land held by any person as a tenant, such tenant shall pay yearly during the continuance of his lease the interest, calculated at six pounds per centum per annum, upon the cost of construction; provided, however, that no tenant whose unexpired term of lease does not exceed one year shall be liable to pay any such interest;

(2) upon land occupied by any person having a right to purchase such land, such person shall pay yearly during the continuance of his occupancy the interest, calculated at six pounds per centum per annum, upon the cost of such construction, and shall, on completion of the purchase, pay in augmentation and as part of the purchase money the cost of such construction.

7. Sections two to six inclusive of this Ordinance shall not apply to areas under the ownership, management or control of Municipalities, Sanitary Boards or Village Management Boards: provided that compulsory dipping shall be carried out from a date to be fixed by the Administrator in respect of all such animals as he may prescribe in such areas. For the purpose of such compulsory dipping the Administrator may provide or direct the local authorities to provide dipping tanks and fix or approve a scale of fees for the dipping of animals.

8. The Administrator may, in areas where compulsory dipping is in force, provide dipping tanks for the common use—

(1) of owners of less than one hundred morgen;

(2) of natives in native reserves;

and fix or approve a scale of fees for the dipping of animals.

9. Notwithstanding the provisions of section two and section seven of this Ordinance, the Administrator may in any place suspend compulsory dipping for such time and to such extent as may be deemed expedient.

10. The Administrator may delegate any powers conferred on him by this Ordinance to such persons as he may nominate by notice in the *Gazette*.

11. Any person duly authorised thereto by the Administrator may enter upon any land, farm or premises for the purpose of—

(1) examining any dipping tank thereon;

(2) ascertaining that compulsory dipping is being carried out; or

(3) taking a sample or samples of dip.

12. Any person who shall refuse or neglect to erect a dipping tank, if ordered to do so in terms of section four hereof, or who, being the owner of such tank, shall refuse or neglect to keep the same in a proper state of repair, or any person who, being the owner or responsible for the supervision or control of animals in any area in which compulsory dipping has been ordered, shall refuse or neglect to carry out such dipping in respect of animals included in such order in a dip of the prescribed materials and strength, shall on conviction be liable to a penalty not exceeding twenty pounds, and in default of payment to imprisonment with or without hard labour for a period not exceeding one month.

13. The Administrator may make, alter or repeal regulations for the better carrying out of the provisions of this Ordinance. Any person convicted of a contravention of the regulations shall be liable to the penalties prescribed by section twelve of this Ordinance.

14. This Ordinance may be cited for all purposes as the "Compulsory Dipping Ordinance, 1914."

Nos. 381 of 1914 and 200 and 266 of 1916.]

COMPULSORY DIPPING.

UNDER and by virtue of the powers vested in me by section 7 of the "Compulsory Dipping Ordinance, 1914," I hereby declare that the provisions of that Ordinance shall be applied in respect of cattle within the following areas from the date of issue of these Notices, dipping to take place at such intervals as the Chief Veterinary Surgeon shall direct.

The areas under the control of the Municipalities of Salisbury, Bulawayo, Gwelo and Umtali, the Sanitary Boards at Gatooma and Victoria, and the Village Management Boards at Que Que, Melsetter, Penhalonga, Marandellas, Hartley, Enkeldoorn, Avondale, Umvuma, Selukwe, Gwanda, Blinkwater, Plumtree and Rusape.

Further, I do hereby declare that a charge of one penny per head will be made in respect of all cattle dipped at Government dipping tanks, except unweaned calves, for which no charge will be made; and one penny in respect of all horses, mules and donkeys, and ½d. in respect of all sheep.

No. 70 of 1915.] [4th March, 1915.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notice No. 353 of 1913 and declare that within the area defined below, after date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven

days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

An area including parts of the native districts of Bulawayo, Umzingwane, Matopo, Bubi and Bulalima-Mangwe, bounded by and including the following farms :—

Lochard Block, Greenlands, Wessels, Allendale B, Oscardale, St. Ninian's, Fincham's, Inyati Reserve, Lortondale, Wynslay Estate, Greville, that portion of unalienated land lying south of a line drawn from the most westerly beacon of Dollar Block and the north-eastern beacon of Killegar, Killegar, Braemar Block, Portive, Robert Block, Induna, Waterfall, Dingaan, Rouxdale, Fundisi, Umkein, Seaborough, Devonby, Helenvale, Slight's, Billar's, Craiglee, Bluebonny, Ireland, Welcome, Paul's Rest, McGeer's Luck, Centenary Mission, Maritzburg, Springvale, Outspan No. 3, Tati Road, De Hoop, Anglesea, Mineral King, World's View, Matopo Block, Brethren in Christ Mission Farm, Absent, the unsurveyed land lying north of a line drawn from the south-east beacon of Absent to the south-west beacon of The Range, The Range, Clark's, Swaithe's, Limerick, Pioneer's Rest, Mayhill, Rietfontein, Bradford, Hamilton, Mayfair, York, Indina, Rathline, Westondale, sub-division A of Fochabers, Fochabers, Kodhwayo, Zimbile and Lochard Outspan.

No. 206 of 1915.] [25th June, 1915.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that within the area defined below, on and after the date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

All surveyed farms in the native district of Melsetter south of the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge and Biriwiri, including the Ingorima Reserves and Mafusi Reserve, and excluding the farms Umzelezwe, Nyagadzi, Mhungura, Pangela, Passage, Mangani, Chengwe, Gumera, Umbugu, Nhori, Elongwe and Mamzwera.

No. 318 of 1915.] [3rd September, 1915.

AFRICAN COAST FEVER. COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that within the area defined below, on and after the date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

That portion of the native district of Melsetter north of and including the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri, and the Nyanyadzi River; and that portion of the native district of Umtali lying south of the Impodsi River from its junction with the Odzi River to its junction with the Shetora River, thence up the Shetora River to the farm Butler North and including that farm and Banti North.

No. 355 of 1915.] [1st October, 1915.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notice No. 527 of 1914, and declare that within the area defined below, on and after date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

An area in the Salisbury and Mazoe native districts bounded by and including the following farms :—Lilfordia, Saffron Waldon, Kilworth, Porta, Reserve, Clement's Plot, Warwickshire, Oatlands, Amalinda, The Rest, Langford, Saturday Retreat, Reserve, Odar, Stoneridge, Longlands, Seki Native Reserve, Dunstan Estate, Banana Grove, Mayfair, Galway Estate, Sebastopol, Gardiner, Gilnockie, Cromlet, Learig, Reserve, Meadows, Mount Shannon, Halstead, western portion of Chindamora Reserve, Pote, Valeria, Spelonken, Arnold's, Smithfield, Brundret, Spitzkop, Summerdale, Rockwood, Somerset, Southmoor, Howick Estate, Leeuw's Rust, Klein Kopjes, Oude Kraal, Mooi Leegte, Reserve, Bitton, Syston, The Lily and Killiemore.

No. 402 of 1915.] [5th November, 1915.

COMPULSORY DIPPING OF CATTLE : ENTERPRISE SECTION OF SALISBURY NATIVE DISTRICT.

UNDER and by virtue of the powers vested in me by section 2 of the "Compulsory Dipping Ordinance, 1914," I do hereby declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

Description of Area.

An area bounded by and including the following farms :—Halstead, Mount Shannon, The Meadows, Ivordale, Ivanhoe, Oribi, Colga, Neptune Mashona Kop, Mashona Vlei, Vuta, Chinyika, Lonely Park, Grazeley Guernsey, adjoining vacant ground, Cromlet, Father Hartmann, Chisha washa, Stuhm, The Springs, The Grove and Umritsur.

No. 423 of 1915.] [19th November, 1915.

COMPULSORY DIPPING OF CATTLE : MELSETTER AND UMTALI DISTRICTS.

UNDER and by virtue of the powers vested in me by section 2 of the "Compulsory Dipping Ordinance, 1914," I do hereby declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

Description of Area.

All surveyed farms and the Ingorima and Mafusi reserves, in the native district of Melsetter, excluding Umzelezwe, Nyagadzi, Mhunguru, Pangela, Passage, Mangani, Chengwe, Gumera, Umbugu, Nhori, Elongwe and Mamzwera; and including the following farms in the native district of Umtali : Tom's Hope West, Steynstroom, Thabanchu, Penkridge, Macandrews, Cronley and Lisnacloon.

No. 21 of 1916.] [21st January, 1916.

COMPULSORY DIPPING OF CATTLE: SALISBURY, MAZOE AND HARTLEY DISTRICTS.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," to declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

Description of Area.

An area bounded by and including the following farms:—St. Mary's, Stoneridge, Odar, Reserve, Saturday Retreat, Chizanza, Suum Cuique, Arbroath, Langford, The Rest, Amalinda, Oatlands, Warwickshire, Clement's Plot, Reserve, Porta, Lyndhurst, Riverside, Herren Hausen, Lilfordia, Killiemore, The Lily, Ballineety, Fairview, Spa, Passaford, Springvale, Mbebi, Umsasa, Great B, Christon Bank, St. Gerera, Willesden Farm, Borrowdale Estate, Luna, Glen Lorne, Gletwyn, Sternblick, Manresa, Caledonia, Sebastopol, Galway Estate, Mayfair, Nalire Reserve, Buena Vista and Seki Reserve.

No. 22 of 1916.] [21st January, 1916.

COMPULSORY DIPPING OF CATTLE: MAKWIRO AREA, HARTLEY DISTRICT.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," to declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

Description of Area.

An area bounded by and including the following farms:—Umfulia, Dorothy Hill, vacant land, Seigneury Reserve, Zimbo Junction, Serui Drift, Strathmore, Scotsdale, Cape Boys' Reserve, Railway Farm No. 22, vacant land between Railway Farm No. 21 and Spencer, Spencer, Railway Farm No. 23, Woodsgift, Railway Farm No. 25, Southwood, Northwood, Niklot, Rothwell Extension, Hunyani Estate, Hunyani Estate No. 2, Stanhope, Cromdale, Garthnor, Serui, Curlewood, Cotswold and vacant land and farms lying within a line from the most easterly beacon of Cotswold to the north-east beacon of Fort Martin, thence to the south-east beacon of Fort Martin and from there due south to the Umfuli River and down that river to the farm Umfulia.

No. 98 of 1916.] [17th March, 1916.

COMPULSORY DIPPING OF CATTLE: MARANDELLAS AND SALISBURY DISTRICTS.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," to declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

Description of Area.

An area bounded by and including the following farms:—Rakodsi, Longlands, Shepparton (portion of Lendy Estate), Progress, Rockery, Shortlands, Rastenburg, Loquat Grove, Cornwall, Norfolk, Middlesex, Kent, Suffolk, Sussex, Rupture, Argosy, Weir, Inandu, Seaton, Rapture, Sunny Fountains, Mangwendi Mission, Retreat and Springvale.

No. 159 of 1916.] [5th May, 1916.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Compulsory Dipping Ordinance, 1914," to amend Government Notice No. 98 of 1916 by substituting the word "fourteen" for "seven" in the last line, and adding after "days" the words "except during the months of June, July and August, when the intervals shall not exceed twenty-eight days."

No. 126 of 1916.] [14th April, 1916.

COMPULSORY DIPPING OF CATTLE: SHAMVA AREA, MAZOE DISTRICT.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," to declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

An area bounded by and including the following farms:—The Carse, Burnleigh, Woodlands, Ceres, Murgwi, Zombi, Chewarika, Maienzi, Maxton, Lone Star Reserve No. 2, Richlands, M. E. D. Reserve, New Brixton, Dillon, Mullingar, Mumwi, Chipoli, Ellerslie, Wolley, Wapley, Lion's Den, and thence from the south-eastern beacon of Lion's Den up the Poorti River to the north-western beacon of The Carse.

No. 208 of 1916.] [2nd June, 1916.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Compulsory Dipping Ordinance, 1914," to amend Government Notice No. 126 of 1916 by adding after "days" in the last line the words "except during the months of May, June, July, August, September and October, when the intervals shall not exceed 14 days."

No. 260 of 1916.] [21st July, 1916.

COMPULSORY DIPPING OF CATTLE: BINDURA AREA, MAZOE DISTRICT.

IN accordance with the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," notice is hereby given that the owners resident in the area described below have by a majority of votes requested His Honour the Administrator to bring compulsory dipping of cattle into operation in the said area, and that he intends to comply with the said request.

Any person desiring to lodge an objection to the bringing into operation of compulsory dipping as aforesaid shall do so on or before the 22nd September, 1916.

Description of Area.

An area bounded by and including the following farms: Wiseacre, Erin, Pimento Park, Duiker Flat, Jesmond Deane, The Ridge, Malvern, Selwood, Marston, Nan Terra, Retreat, Nomansland, Verganoeg, Caledon, Chiwaridza Reserve, Dengeni, Vredehoek, Arcadia, Hereford, The Vale, Bonny, Wild Dog Valley, Atherstone, Kingston, Hildadale, Cardiff and Poorti Outspan.

No. 261 of 1916.] [21st July, 1916.

COMPULSORY DIPPING OF CATTLE: RUSAPE AREA, MAKONI DISTRICT.

IN accordance with the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," notice is hereby given that the owners resident in the area described below have by a majority of votes requested His Honour the Administrator to bring compulsory dipping of cattle into operation in the said area, and that he intends to comply with the said request.

Any person desiring to lodge an objection to the bringing into operation of compulsory dipping as aforesaid shall do so on or before the 22nd September, 1916.

Description of Area.

An area bounded by and including the following farms: The Willows, The Springs, Howick, Leeuw Poort, Highfield, Emerald, Kirkly Vale, Lawrencedale Estate, Chimbi, Notgotimvet, Diana, Inyagura, Cheira, Cheira Source, Invercargill, Wick, Makoni Reserve, Mount Zonga, Reserve, Inyamasanga, Windsorton, Manda, Zimati, Mount Tikwiri, Rocking Stone, Lesapi Falls, Recondite, Cheronga and Lesbury.

No. 337 of 1915.] [17th September, 1915.

ENZOOTIC ABORTION.

IT is hereby notified for public information that nothing contained in the several Government Notices declaring certain areas to be actively infected with the disease known as enzootic abortion, for the purposes of the "Animals Diseases Consolidation Ordinance, 1904," and the "Animals Diseases Amending Ordinance, 1911," shall be taken to prohibit the movement of oxen to, from or through such areas, subject to compliance with the laws and regulations governing the movement of cattle.

No. 186 of 1914.] [23rd April, 1914.

IMPORTATION OF CATTLE.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel the regulations published under Government Notice No. 128 of 1914, and make the following provisions in lieu thereof:—

1. The importation of cattle will be permitted from the Cape Province, the Orange Free State and the Transvaal on the following terms and conditions:—

(1) A permit shall be required from the Chief Inspector, which may contain such conditions as shall from time to time appear expedient.

(2) The importation of cattle with more than two permanent central incisor teeth shall not be permitted, except that animals entered in the South African Stud Book or the appendix thereto, with not more than the first and second pairs of permanent incisors, may be imported.

(3) Applications for permission to import shall be in the form "A" attached hereto, and accompanied by a declaration in the annexed form "B."

(4) All importations shall be by rail, and for the purposes of importation, Bulawayo shall be the port of entry.

(5) All cattle imported in terms of these regulations shall, on arrival at Bulawayo, Salisbury or Umtali, be submitted to such examination or tests as the Chief Inspector may direct. If such examina-

tion or tests disclose the existence of any destructive disease, the cattle shall be immediately destroyed and the carcases thereof disposed of in such a manner as a Government Veterinary Surgeon may authorise or require. The Chief Inspector may permit of the age restriction and the tests aforesaid being dispensed with in the case of cattle in transit by rail to any place beyond the borders of Southern Rhodesia.

(6) All expenses or losses incident to quarantine, examination, testing or destruction as aforesaid shall be borne by the owner of the cattle.

2. The importation of cattle from the United Kingdom of Great Britain and Ireland, the United States of America, the Kingdom of the Netherlands and Germany will be permitted under the following terms and conditions :—

(1) Importation shall be through and direct from the ports of Cape Town or Port Elizabeth, and there shall be a consignment note or other satisfactory evidence that cattle so imported have come direct from one of the above-mentioned countries.

(2) The provisions of sub-sections (1), (5) and (6) of section 1 hereof shall apply to importations in terms of this section.

3. Any person introducing cattle in contravention of these Regulations, or failing to comply with any of the conditions attached to permits to import, or furnishing applications, declarations, or other necessary documents known to be false in any material particular, or failing to comply with all lawful directions as to quarantine, examination, testing, destruction or disposal of carcases, shall be liable to a fine not exceeding £20 for each animal in respect of which such offence shall have been committed, and in default of payment to imprisonment with or without hard labour for any period not exceeding six months, unless higher or greater penalties shall have been provided for such offences by the "Animals Diseases Consolidation Ordinance, 1904"; provided, however, that the penalties imposed by these Regulations shall not exempt any cattle from destruction in terms of the aforesaid Ordinance.

ANNEXURE "A."

APPLICATION FOR CATTLE IMPORTATION PERMIT.

1. Applicant's Name and Address.....
2. Number and Class of Cattle to be imported.....
3. Area or Farm and District where Cattle are at present located.....
.....
4. Area or Farm and District to which Cattle are to be moved.....
.....

Applicant's Signature.....

Date.....
Application.....
Permit No.....

ANNEXURE "B."

I, ... residing on the farm ..... in the district of ..... do solemnly and sincerely declare that the ..... (number in writing) animals also enumerated below have been in my possession since birth, and that Lungsickness (Contagious Pleuro-Pneumonia) has not existed amongst any of my cattle, nor on my farm, during the last four years, and that these animals have never been exposed for sale in any public market or stock fair.

Number of Animals ..... Bulls ..... Heifers .....
Breed .....

Seller's Name and Address .....

.....

Purchaser's Name .....

Place in Southern Rhodesia to which animals are being sent

.....

And I make this solemn declaration conscientiously believing the same to be true.

.....

Declared to at ..... on this ..... day of.....
before me,

.....

Resident Magistrate for the District of .....

IMPORTATION OF STOCK FROM THE PROVINCE OF THE CAPE OF GOOD HOPE.

WITH reference to Departmental Notice of 28th February, 1912, it is hereby notified that the said Notice is cancelled, and importation of stock will now be permitted, in terms of Government Notice No. 110 of 1908, from the Province of the Cape of Good Hope, with the exception of the following districts :—

Komgha
East London
Peddie
Victoria East
Kingwilliamstown
Stutterheim
Cathcart
Stockenstroom
Queenstown (Gwatyu Ward only)
Glen Grey
Maclear
Elliot Slang River
Wodehouse
Barkly East

No. 169 of 1916.] [5th May, 1916.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Animals Diseases Consolidation Ordinance, 1904," to permit, under the terms and conditions of sub-sections (1), (5) and (6) of section 1 of Government Notice No. 186 of 1914, the importation from the Cape Province, Transvaal, Orange Free State and Natal of pure-bred cattle originally imported from the United Kingdom of Great Britain and Ireland, the United States of America and the Kingdom of the Netherlands. Every application for permission to import shall be accompanied by a certificate in the form of the annexure attached hereto.

Annexure.

I.....residing on the farm.....in the district of.....in the Union of South Africa, do solemnly and sincerely declare that the.....(number in writing) animals enumerated below have been in my possession for.....and that lung-sickness has not existed amongst any of my cattle during that period; and further, that such animals are not prevented by any regulations or agreement in respect of freight from being exported from the Union.

Description of Animals.

Breed.	Stud Book in which entered.	Sex, Name and Number in Stud Book.	Country of Origin.
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....

And I make this solemn declaration conscientiously believing the same to be true.

.....

Declared to at.....on this.....day ot..... 19.....before me,

.....

Resident Magistrate for the district of.....

Names of former owners.....

.....

No. 364 of 1914.] [27th August, 1914.

REGULATIONS GOVERNING IMPORTATION OF LIVE STOCK, Etc.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended from time to time, I do hereby cancel the regulations published under Government Notices Nos. 295 and 394 of 1908; 38, 61 and 263 of 1909; and 60 of 1911 and 188 of 1912, 47 of 1913, and so much of any other regulations as may be repugnant to or inconsistent with the subjoined regulations, which are hereby declared to be of full force and effect.

1. The importation of the following animals from the respective countries or districts enumerated is prohibited, owing to the existence or supposed existence of destructive diseases affecting the said animals in the said countries :—

(1) All animals and dogs as defined by the aforesaid Ordinance from—

India,
Mauritius,
Persia,
British Burmah,
Assam,
China and bordering countries, including Korea,
French Indo-China,
Dutch East Indies,
Hong-Kong,
Federal Malay States,
The Philippines,
Zanzibar,

and all other countries where surra is known or suspected tc exist.

(2) Pigs from the Union of South Africa, the Bechuanaland Protectorate, the Tati Concession, and other countries in which swine fever exists or is suspected to exist, subject, however, to the exceptions contained in the proviso to this section.

(3) Dogs from the territories of Northern Rhodesia and Portuguese East Africa, subject, however, to the exceptions in the proviso of this section.

(4) Sheep and goats from the districts of Albany, Alexandria, Bathurst, Bedford, East London, Fort Beaufort, Humansdorp, Jansenville, Kingwilliamstown, Komgha, Peddie, Somerset East, Stockenstroom, Uitenhage and Victoria East, in the Cape Province; the districts of Barberton, Lydenburg, Marico, Pretoria, Rustenburg, Waterberg and Zoutpansberg, in the Transvaal; Swaziland, Portuguese East Africa, Northern Rhodesia.

Provided, however—

(a) that the Chief Inspector may at his discretion permit the importation of pigs, sheep and goats from the above-mentioned places on production of a certificate signed by a duly authorised Government Veterinary Officer in the form of Schedule "A" attached hereto;

(b) that the importation of dogs required for scientific purposes only may be permitted from the places mentioned in sub-section (3) hereof, by the Chief Inspector, in writing, subject to such conditions as may be imposed by him;

(c) that dogs, sheep, goats and pigs from countries from which importation is permitted may be introduced *via* the port of Beira, provided that all such animals shall be transferred directly after disembarkation to the railway trucks at Beira, and conveyed thence to Umtali without leaving the said trucks.

2. The areas set out in Schedule "B" hereto are hereby appointed for the depasturing and quarantining of animals for slaughter in connection with the places therein mentioned.

3. The several districts of Southern Rhodesia are hereby declared to be an area infected with scab amongst sheep and goats, and the movement of all sheep and goats from any farm to beyond the limits thereof, or from their usual grazing ground within the limits of any town lands or native reserves to any other place, is prohibited, except under the written permit of an Inspector or Sub-Inspector. Such permit shall set forth the number and description of animals to be moved, the route they shall travel, and the period for which the permit shall be in force. In cases where it may be necessary or desirable, the person to whom such permit is issued may be required to cause the animals referred to therein to be dipped before being moved.

4. The introduction of sheep and goats is prohibited except—

(a) as specially provided for by section 1 hereof;

(b) from places not mentioned in section 1, if accompanied by a certificate in the form set out in Schedule "C" hereof.

5. The owner or person in charge of any horse, mule or donkey entering Southern Rhodesia by rail shall immediately report such arrival to the Veterinary Office at Salisbury, Bulawayo and Umtali respectively, and no such animal shall be detrained at any intermediate station without the written authority of a Government Veterinary Surgeon.

6. The owner or person in charge of any horse, mule or donkey entering Southern Rhodesia by road shall immediately report such arrival at the Police Camp nearest to the place where such entry is made, and the officer in charge of such Police Camp shall immediately report to the Veterinary Department, which shall direct what steps are to be taken to test such animals with mallein, as in the following clause provided.

7. All horses, mules and donkeys, upon entering Southern Rhodesia, shall be tested with mallein, and the owner or person in charge of such animals shall in all respects carry out the lawful directions of the Inspector while such animals are being tested; provided that this regulation shall not apply to animals in transit through Southern Rhodesia which are not detrained *en route*.

8. Horses, mules and donkeys lawfully in this Territory, and required for purposes necessitating frequent crossing of the border, may be allowed to so cross on such terms as to registration, branding, testing and conditions as the Chief Veterinary Surgeon may from time to time deem expedient to prescribe.

9. An Inspector may direct the thorough cleansing and disinfecting of trucks which may be reasonably suspected of being sources of infection of any destructive disease, and may direct the destruction of truck fittings, fodder, excreta, or other matter or thing which may be reasonably calculated to convey such infection.

10. Any persons contravening the provisions of these regulations, or the instructions or directions given in terms of these regulations, shall be liable in respect of each offence to a penalty not exceeding twenty pounds, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months, unless where more or heavier penalties have by the aforesaid Ordinance, or by other regulations framed thereunder, been expressly provided.

SCHEDULE "A."

Certificate.

Issued under provisions of section 1, Government Notice No. 364 of 1914.

This is to certify that the animals enumerated below are, in my opinion, free from any destructive disease, including heartwater; and, to the best of my knowledge and belief, have not been in contact with any infected animals, nor come from, or through, a locality where any such disease is known to exist or has existed for twelve months from date hereof.

Date....., 19...

Place .....

.....

Signature of
Government Veterinary Surgeon.

Number and general description of animals :

.....Pigs, ...Sheep, ...Goats.

Place from which animals are to be sent :

.....

Owner's name and address :

.....

.....

Place in Southern Rhodesia to which it is desired to send the animals .....

SCHEDULE "B."

Description of areas set apart for depasturing and quarantining of animals for slaughter.

Salisbury.—A fenced piece of land, 400 acres in extent, situated on the Makabusi River below Maggio's plot, within the Salisbury commonage and towards the southern boundary thereof.

Bulawayo.—That piece of fenced land situated on the Bulawayo commonage between the railway line, to the south, and the Solusi road, adjoining and to the south-west of the Government dipping tank, in extent 1,000 acres more or less.

Gwelo.—Starting from a point where the Ingwania road crosses the railway, along this road past the sanitary stables to a point a quarter of a mile west, thence in a line parallel with the railway to the Gwelo River, thence along the river to the commonage beacon No. 11, thence in a straight line to the Shamrock road where it is intersected by the Scout's Spruit, thence along the Shamrock road to where it joins the Main Street extension, thence along this to the railway line, and down this to the starting point.

Umtali.—A piece of fenced land situated on the old Darlington Farm section of the Umtali commonage.

Penhalonga.—A piece of fenced land situated on plot No. 2, Imbeza plots.

Selukwe.—A piece of fenced land, in extent about 300 acres, situated on the farm Sebanga and adjacent to the township of Selukwe.

SCHEDULE "C."

I, ... residing at .....
in the district of... ..... in the.....
Colony, do solemnly and sincerely declare that the animals enumerated below are free from any contagious disease, including scab, and have not been in contact with any infected animals within six months from date hereof, and that, to the best of my knowledge and belief, such animals, in travelling to.....† station, will not come in contact with any animals amongst which scab or any other contagious disease exists.

And I make this solemn declaration conscientiously believing the same to be true.

.....

Declared to at.....on this..... day of.....before me.

.....

Magistrate, Government Veterinary Surgeon, Scab Inspector, or Police Officer of district from which animals are being sent.

Number and general description of animals being sent.....

Owner's name and address.....

.....

Place in Southern Rhodesia to which animals are being sent.....

† Station within Colony of origin.

No. 442 of 1914.] [15th October, 1914.

ISSUE OF PERMITS FOR THE REMOVAL OF STOCK.

IT is hereby notified for public information that His Honour the Administrator has approved of members of the British South Africa Police issuing permits for the removal of cattle, sheep and goats at the undermentioned stations when no Inspector or Sub-Inspector of Cattle is available :—

Nyamandhlovu.	Mphoeng's.
Gwanda.	Holi.
Plumtree.	Filabusi.
Fort Rixon.	Gwaai.
Belingwe.	Figtree.
Inyati.	Umvuma.
Fort Usher.	Que Que.

No. 410 of 1915.] [12th November, 1915.

ISSUE OF PERMITS FOR REMOVAL OF STOCK.

IT is hereby notified for public information that His Honour the Administrator has approved of members of the British South Africa Police issuing permits for the removal of cattle, sheep and goats at the undermentioned stations when no Inspector or Sub-Inspector of Cattle is available :—

Mazunga.	Tuli.
Makwiro.	Sinoia.
Banket Junction.	Buhera.
Makaha.	

No. 12 of 1916.] [14th January, 1916.

ISSUE OF PERMITS FOR REMOVAL OF STOCK.

IT is hereby notified that His Honour the Administrator has approved of members of the British South Africa Police issuing permits for the removal of cattle, sheep and goats at the Beatrice Mine.

No. 172 of 1916.] [12th May, 1916.

ISSUE OF PERMITS FOR REMOVAL OF STOCK.

IT is hereby notified that His Honour the Administrator has approved of members of the British South Africa Police issuing permits for the removal of cattle, sheep and goats at Wedza, in the native district of Marandellas, when no Inspector or Sub-Inspector of cattle is available.

No. 375 of 1912.] [28th November, 1912

IMPORTATION OF POULTRY.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended by the "Animals Diseases Amendment Ordinance, 1910," I do hereby declare and make known that the following regulations shall be in force and effect from date of publication hereof :—

(1) All poultry imported by rail shall be inspected by an Inspector or Sub-Inspector at Plumtree, Bulawayo or Umtali.

(2) Should any consignment of poultry shew symptoms of disease, or should such Inspector or Sub-Inspector have reason to believe that any disease exists in, or that infection is likely to be conveyed by such consignment, he may order the detention and isolation of the whole consignment for such period as he may deem necessary.

(3) The Chief Inspector may order the destruction of all poultry which he has reasonable grounds for believing to be diseased or likely to convey infection.

THE following extract from Live Stock Regulations, printed on page 150 of the South African Railways Official Tariff Book, is published for general guidance :—

Poultry are not accepted by rail unless they are placed in a crate and the following conditions are complied with :—

(1) The size of the crate shall be 3 feet 6 inches by 2 feet 9 inches external floor dimensions; for turkeys and geese the height shall be 30 inches; and for fowls, ducks, and poultry of a like size, the height shall be 20 inches.

(2) Each crate must contain two drinking vessels filled with pure water, such vessels to be not less than five inches in depth, of the unspillable type, one being fixed at opposite corners of the coop.

(3) Each crate shall contain two receptacles for food of a suitable size, filled with suitable food other than whole maize.

(4) The birds must not be over-crowded in the crates, and in no case must there be more than 20 fowls, ducks or other birds of a like size, or ten turkeys or geese

(5) Different species of birds must not be placed in the same coop.

Unless coops, crates, and the like are strong enough to bear ordinary transit handling, the Administration will not accept responsibility for loss.

No. 227 of 1916.] [23rd June, 1916.

POUND AT PLUMTREE.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 5 of "The Pounds and Trespasses Ordinance, 1903," at the request of the Civil Commissioner, Bulawayo, to declare and make known that the pound on the plot Rangiora, Plumtree, established by Government Notice No. 412 of 1914, is hereby abolished, and that a pound has been established on the farm Brantwood, near Plumtree, in the magisterial district of Bulawayo, and that the said pound shall be available for the public from date hereof.

No. 230 of 1916.] [23rd June, 1916.

POUND AT MAKWIRO.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 5 of "The Pounds and Trespasses Ordinance, 1903." at the request of the Civil Commissioner, Hartley, to declare and make known that the pound on the farm Pollokshields, Makwiro, established by Government Notice No. 529 of 1914, is hereby abolished, and that a pound has been established on the farm Cromdale, near Makwiro, in the magisterial district of Hartley, and that the said pound shall be available for the public from date hereof.

MAKWIRO POUND.

IT is hereby notified for general information that Mr. F. R. McLellan has been appointed master of the Makwiro Pound, situate on the farm Cromdale, and that during his temporary absence Mr. E. J. F. Smith will act for him.

From date hereof the fees under Schedules E, F and G of "The Pounds and Trespasses Ordinance, 1903," will be doubled in all cases where the number of animals impounded at one and the same time and in respect of the same trespass does not exceed 25 head.

Sales will be held at 10 a.m. on the third Friday of every month opposite the Makwiro Hotel.

A. L. BAKER,
Civil Commissioner.

Civil Commissioner's Office,
Hartley, 24th June, 1916.

POUND SALES—GWELO DISTRICT.

POUND sales during the next six months will be held as follows :—

Selukwe pound—Third Saturday in each month at 10 a.m.
Que Que pound—Second Saturday in each month at 11 a.m.
Hill View Farm pound, Lalapanzi—Second Saturday in each month at 11 a.m.
Iron Mine Hill pound—Third Saturday in each month at 10 a.m.

W. R. SHAND,
Civil Commissioner.

Civil Commissioner's Office,
Gwelo, 27th June, 1916.

SUMMARY OF THE GAME LAWS.

Game is divided into three distinct classes, described as follows :—

(a) Birds and Small Buck.

(b) Bushbuck, Hartebeest, Impala, Lechwe, Pookoo, Roan and Sable Antelope, Sitatunga, Tsessebe, Waterbuck, and Wildebeest.

(c) Royal Game, which includes Eland, Elephant, Giraffe, Gemsbok, Hippopotamus, Inyala, Koodoo, Ostrich, Rhinoceros, Springbuck and Zebra.

The shooting season for Class "A" is as follows :—

In Mashonaland :

Birds from 1st May to 30th September.
Small Buck from 1st May to 31st October.

In Matabeleland :

Birds and Small Buck from 1st May to 31st October.

To shoot in Class "A" a licence costing £1 per annum is required. This entitles holders to hunt in both Provinces during the open season.

Class "B."—The season opens on 1st July and closes on 30th November in both Provinces. The licence fee is £25 for non-residents and £5 for persons having their domicile in Southern Rhodesia. This licence entitles the holder to shoot up to 15 head, which number may be increased to a total of 25 upon payment of a further sum of £15 in the one case and £5 in the other.

Class "C."—The Administrator may, if he is satisfied that the animals are actually required for scientific purposes, grant to the holder of a game licence permission to shoot or capture any of the species included in this Class. Such permit requires a £5 stamp. Applications in writing, together with proof of *bona-fides*, should be addressed to the Director of Agriculture.

Game for Farming Purposes.—Permits may be granted for the capture of Eland, Ostrich, Zebra or other animals for the purposes of breeding or farming. Such permits require a stamp of the value of £1 and remain in force for six months. Application, accompanied by a sworn declaration, should be made through the Director of Agriculture or the Civil Commissioner of the district.

Game Injuring Crops.—The occupier of any cultivated land or any person acting under the authority of such occupier, may at any time destroy game actually doing damage on such land.

Export of Game.—No living Game or the Eggs of any Game Birds may be exported beyond the limits of Southern Rhodesia without a written permit.

Shooting on Private Land.—A licence does not entitle the holder thereof to shoot on private land without the permission of the land-owner.

Farmers Shooting Game on their Farms.—By taking out a special £1 licence, farmers may at any time shoot any game on their land. "Game" does not include any birds, except ostriches.

Open Area.—The shooting or capturing of all classes of game with the exception of ostriches and other birds classified as game is permitted within the following area in the Hartley district until further notice :—

Hartley District.—From the railway bridge on the Umfuli River, thence north-westwards along the Umfuli River to where it joins the Umniati River, thence southwards along the Umniati River to where it joins the Umsweswe River, thence eastwards along the Umsweswe River up to the drift at the Lydia Mine, thence along the old road from Lydia Mine to Etna Mine and to Inez Mine, thence northwards along the road from Inez Mine to Hartley, thence in the direction of the railway bridge to the starting point on the Umfuli River.

The game specified may be shot in this area without a licence.

Protected Area.—All game is strictly preserved in the Urungwe Game Sanctuary as defined below :—

An area in the Lomagundi district, bounded as follows : On the north and west by the River Zambesi, starting at the point where the Lozenzi River joins the Zambesi, and following the course of the latter river to its junction with the Sanyati River ; on the east by an imaginary line drawn from the junction of the Indurune and the Nyaodsa Rivers to the head-waters of the Lozenzi River, and thence along the course of the Lozenzi River to its junction with the Zambesi River ; on the south by an imaginary line drawn due west from the point of junction of the Indurune and Nyaodsa to the Sanyati River, thence along the course of this river to where it enters the Zambesi.

Game in Class "A" may be hunted in the close season until further notice on private land in the Melsetter district by holders of a licence.

"Locust Birds" are strictly protected, *vide* Government Notice No. 396 of 1912.

Elephants on Occupied Farms, Melsetter.—The destruction of Elephants when found on occupied farms on the High Veld in Melsetter District is authorised (*vide* Government Notice No. 284 of 1908).

Trespassing on native reserves, in pursuit of game or otherwise, is prohibited, except with the written permission of the Chief Native Commissioner.

Trypanosomiasis.—Persons in search of game in the southern part of the Sebungwe district are warned of the danger of hunting anywhere west of the Sengwe and Lutope Rivers within the fly area, and especially of proceeding anywhere within the valley of the Busi River.

No. 183 of 1916.] [19th May, 1916.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 4 (2) of the "Game Law Consolidation Ordinance, 1906," to suspend the operations of sections 9, 10 and 12 of the said Ordinance in so far as they relate to the killing, hunting or capture of game in Class "A" in the native districts of Victoria, Ndanga, Gutu and Chibi, for a period of six months from date hereof.

No. 86 of 1916.] [10th March, 1916.

CANCELLATION OF OPEN SHOOTING AREA IN THE LOMAGUNDI DISTRICT.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Game Law Consolidation Ordinance, 1906," to cancel from date hereof Government Notice No. 273 of 1915, which suspended the operations of sections 9, 10 and 12 of the said Ordinance in respect of all game, with the exception of ostriches and other birds classified as game, within a certain area in the Lomagundi district.

No. 87 of 1916.] [10th March, 1916.

CANCELLATION OF OPEN SHOOTING AREA IN THE SEBUNGWE DISTRICT.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Game Law Consolidation Ordinance, 1906," to cancel from date hereof Government Notices Nos. 227 of 1913 and 312 of 1914, which suspended the operations of sections 9, 10 and 12 of the said Ordinance in respect of all game, with the exception of ostriches and other birds classified as game, within a certain area in the Sebungwe district.

No. 202 of 1916.] [2nd June, 1916.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 4 (2) of the "Game Law Consolidation Ordinance, 1906," to suspend the operations of sections 9 and 12 of the said Ordinance, in so far as they relate to the killing, hunting or capture of game in Classes "A" and "B" in the native district of Sebungwe, for a period of eight months from date hereof.

No. 160 of 1916.] [5th May, 1916.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Game Law Consolidation Ordinance, 1906," to declare

that the provisions of Government Notice No. 171 of 1915, under which the shooting, hunting or destruction of all game within the limits of the commonage or townlands of Umtali was prohibited up to the 30th April, 1916, shall remain in force for a further period of one year from the 1st May, 1916.

No. 201 of 1916.] [26th May, 1916.

REWARD FOR THE DESTRUCTION OF WILD DOGS.

HIS Honour the Administrator in Council has been pleased to approve payment of a reward of five shillings for each wild dog destroyed whose destruction is reported and the reward claimed in the manner hereunder set forth.

Rewards will be paid to Europeans by any Magistrate or Native Commissioner and to natives by any Native Commissioner within three months of the date upon which the animal is killed, on a solemn declaration in the form hereinunder prescribed.

In proof of destruction, applicants for the reward will be required to produce and surrender the skin of the animal with the tail not severed.

Form of Declaration.

I,....., do solemnly and sincerely declare that I did, on the.....day of....., and not before, destroy.....wild dog(s) in the district of....., within the boundaries of Southern Rhodesia, and that I am entitled to the reward offered by the Government, and I make this solemn declaration conscientiously believing the same to be true.

.....
Signature.

Signed and declared at.....this.....day of .....

Before me,

.....
Magistrate or Justice of the Peace.

No. 249 of 1908.] [27th August, 1908.

PROTECTION OF TREES.

IT is hereby notified for public information that any person who shall cut down for use as fuel, or for any other purposes than *bona-fide* farming, mining or manufacturing purposes, or cause to be so cut down the "Wild Westeria" (native name M'Pakwa or M'poea) tree, will be liable to prosecution for contravention of the provisions of the Forest and Herbage Preservation Act, 1859, and upon conviction to a fine not exceeding £100, or to imprisonment with or without hard labour for a term not exceeding six months, or to such fine and imprisonment, or to such imprisonment without a fine.

No. 163 of 1909.] [29th July, 1909.

ANY person who shall cut down or destroy, or cause to be cut down or destroyed, the "Shuma" or "Mashuma" tree, except under written authority from the Estates Office of the British South Africa Company, and subject to such conditions as may be imposed therein, will be liable to prosecution for contravention of the "Forest and Herbage Act, 1859," and, upon conviction, to a fine not exceeding £100, or to imprisonment, with or without hard labour, for a term not exceeding six months, or to such fine or imprisonment, or to such imprisonment without fine.

No. 244 of 1916.] [7th July, 1916.

APPLICATIONS FOR USE OF WATER

in terms of Chapter I. of the "Water Ordinance, 1913."

IT is hereby notified that the following applications have been made, in terms of the "Water Ordinance, 1913," for authority to use water :—

Name of applicant.	From what river.	Native district of	For the purpose of irrigating a certain portion or portions of the
F. Clayton -	Unknown	Salisbury	Farm Hatcliffe
E. W. L. Noaks -	Mwengi	Mazoe	,, Limbeck—No. 38, Glendale
Methodist Episcopal Church	Umvum-vuvu	Umtali	Farm McAndrews
A. G. Staunton -	Umwindsi	Salisbury	,, The Grove

Any person or persons whose rights may be affected thereby are hereby called upon, in terms of the regulations published under Government Notice No. 439 of 1915, to lodge, within three months from the date hereof, at the office of the Water Registrar, Salisbury, from whom further particulars are obtainable, their objections (if any) to the granting of these applications, together with a full statement of the grounds for such objections.

No. 262 of 1916.] [21st July, 1916.

IT is hereby notified that His Honour the Administrator, under and by virtue of the powers conferred by the "Water Ordinance, 1913," has been pleased to appoint a Water Court, composed as follows :—

President ... Robert McIlwaine, Esquire, M.A., LL.B.
Assessors { William Martin Watt, Esquire (engineer)
Assessors { Henry Miller Oakley, Esquire (unofficial member)

The said Court shall commence its sittings at Bulawayo on the 14th day of August, 1916, to enquire into and decide upon the following applications referred to it in terms of the said Ordinance :—

(1) An application by the Rhodesia Railways, Limited, to obtain protection for the use of storm water as authorised by His Honour the Administrator by an instrument dated the 23rd December, 1915, of which the following is a copy :—

"Under and by virtue of the powers conferred on me by sub-section (1) of section 16 of the 'Water Ordinance, 1913,' I do hereby authorise the Rhodesia Railways, Limited, to impound and store storm water at a point on the Khami River on its property, being sub-division 'A' of Woolandale Estate and a piece of ground adjoining, granted to the proprietor by the British South Africa Company, as shewn on the annexed diagram, to appropriate to its own use the water so impounded, to use and supply it for the running and working of railways in all departments, for the running and maintenance of railway workshops, for the general use of persons employed on railway work in any capacity, whether administrative or executive, and for the maintenance, conduct and requirements of any settlement or camp occupied by such persons.

"It is a condition of this grant that the said company does not impede the normal flow of the Khami River by the said impounding and storage."

(2) An application by the British South Africa Company, in terms of Chapter I. of the "Water Ordinance, 1913," for authority to use water from the Pongo River for the irrigation of certain of the company's land, namely, sub-division "A" of M'bati Tiabets Block and Shangani Reserve, including the right to divert and store storm and surplus water for the irrigation of three hundred acres of land on both banks of the Pongo River, on sub-division "A," M'bati Tiabets Block, and Shangani Reserve, and two hundred acres on the left bank of the Shangani River, also on the above properties.

Any person interested in the above applications may be heard by the said Court.

John Gordon Greer, Esquire, of the Solicitor General's Office at Bulawayo, has been appointed Clerk of the said Court, with power to issue process and to perform such other duties as are proper to the office of a Clerk of Court.

Department of Posts and Telegraphs,

Southern Rhodesia.

Postal Notice No. 12 of 1913.

AGRICULTURAL PARCELS POST.

IT is hereby notified for public information that, on and after the 1st August, 1909, any article produced, and, if manufactured, produced and manufactured within Southern Rhodesia may be transmitted by Agricultural Parcels Post at the reduced rate of threepence per lb. or fraction thereof, up to a limit of eleven lbs. in weight.

The Agricultural Parcels Post is designed to bring the producer into direct communication with the consumer, and is available for the transmission of :—

Biscuits	Dried Meats	Plants
Bread	Eggs	Poultry
Butter	Flour	Seeds
Confectionery	Flowers	Sugar
Cigarettes	Honey	Tobacco
Dried & Bottled Fruits	Jam	Wool Samples

and other articles produced within Southern Rhodesia. It does not extend beyond the borders of Southern Rhodesia.

The senders of articles at the reduced tariff applicable to the Agricultural Parcels Post will be required to sign a declaration that the contents are the *bona fide* produce of Southern Rhodesia.

The limits of size and weight, and the general regulations, are those applicable to the Inland Parcels Post.

G. H. Eyre,
Postmaster General.

General Post Office, Salisbury,
31st March, 1913.

THE RHODESIA

Agricultural Journal.

Edited by the Director of Agriculture,
assisted by the Staff of the Agricultural Department.

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Editorial.

Correspondence on subjects affecting the farming industry of Southern Rhodesia is invited. Enquiries will be replied to direct, or through the medium of the JOURNAL. *An interchange of ideas and suggestions between farmers will be particularly welcomed. Contributions of a suitable nature for insertion in this* JOURNAL *will be much appreciated. All communications regarding these matters, and advertisements, should be addressed to the Editor, Department of Agriculture, Salisbury.*

THE WORK OF THE IMPERIAL INSTITUTE.—We have recently received copies of a parliamentary report on the work of the Imperial Institute in 1914 and the annual report of the Institute for the same year. We take the opportunity to draw attention to the highly valuable work being carried on by the Institute in the interests of all the Empire Dominions. The department of the greatest importance to us is that of scientific and technical research, the chief object of which is to assist and supplement the work of the various technical departments in the Dominions, Colonies and India, by determining the

composition, quality and value of products which occur or could be produced in the different countries, with a view to the commercial development of the natural resources of the Empire. Materials submitted for examination are first carefully investigated in the laboratories in comparison with products of similar character, and then, if necessary, technical trials are carried out. When the results are sufficiently encouraging, commercial action can often be indicated at once. In other cases the material may be of promising character, but may not be in a suitable form for the market, and it is then generally possible to make suggestions for the improvement of the product, so that it will be saleable.

The Imperial Institute is in regular communication with the leading British technical experts, manufacturers and brokers dealing with raw materials, and is consequently able to bring new products, or known products from new sources, to the notice of firms likely to be specially interested in them. As a result of such action, offers are frequently received from manufacturers to take trial consignments of the products introduced to their notice by the Imperial Institute, and the foundations of an export trade are thus established.

In sending products for examination, it is generally of assistance if information can be furnished as to the approximate quantity which would be available for export, and the price at which the material could be offered.

The opportunity which lies before the Imperial Institute is a unique one, and its strength and organisation give promise that it will perform a function of immense importance in the work of making the Empire independent and self-supporting in the matter of supplying the raw materials for the great home manufactures. The value of the Institute is especially emphasised in the case of colonies still in the initial stages of development, such as Rhodesia, where the productive powers are potential and not fully proved.

Application of Compulsory Dipping Ordinance.—We hear that steps are being taken to have this Ordinance applied to the following districts in Matabeleland and Mashona-

land:—Bindura, Glendale, Rusape, Umtali, Inyazura, Hartley, Gatooma, Lomagundi, Victoria, Gwanda, Matobo, Umzingwane, Nyamandhlovu, Insiza, Bulalima-Mangwe, Bubi, Belingwe, Bulawayo and Wankie. It looks as if this beneficial Ordinance will shortly become nearly universal in its application to Rhodesia, but there are still some districts standing out, including Selukwe, Gwelo, Charter and others.

The Late Captain H. C. Lowry.—It is with deep regret we place on record a further loss sustained by the Veterinary Department in the death of Mr. H. C. Lowry, M.R.C.V.S., who died in Mesopotamia recently. Mr. Lowry entered the Service in February, 1913. He was at that time a member of the Special Reserve of Officers, Army Veterinary Corps. When the war broke out, he was on African coast fever duty in the Melsetter district, and was shortly afterwards recalled by the military authorities. He was present at the landing in Gallipoli, and served throughout that campaign, during which he had a very narrow escape, when a box he was sitting on was shot from under him by a shell. The following day he received a slight bullet wound in the arm, but not sufficient to interfere with duty. Early this year he was sent to Mesopotamia. A few days before the cable news of his death arrived, the Chief Veterinary Surgeon received a letter from Capt. Lowry in which he gave an interesting account of the conditions obtaining in Mesopotamia, some technical details of his professional work with the army, and sent affectionate messages to his many Rhodesian friends. He concluded that letter with a wish that the war was over, and that he "was back to the land of sunshine and fruit." Mr. Lowry, who was promoted captain some months before his death, was well known in Rhodesia, especially in Bulawayo district. He was very keen on his work, and his death is felt as a great loss to the Department.

It is with deep regret we have to record the death, since our last issue, of Mr. E. Wilson. Mr. Wilson was both a successful farmer and a public-spirited citizen. He had for

many years taken a leading part in the farmers' organisations of the country, having served with credit to himself and benefit to his fellow farmers in many honourable and arduous offices, notably as president of the Mashonaland Farmers' Association, chairman of the Farmers' Co-operative Society and president of the Rhodesian Agricultural Union. In all these capacities Mr. Wilson worked hard and accomplished much, and was a fine example of what can be attained by perseverance and ability joined to public spirit. His early and unexpected death is felt as a great loss to the farming community, and we join in the universal sympathy for his bereaved family.

Records of Experiments.—It is possible that some of our readers may think that the present and the last number of the *Journal* make somewhat dry and heavy reading owing to the inclusion of a number of long and exhaustive articles all dealing with kindred subjects, namely, the results of a variety of experiments. In this connection we may point out that experimental work in all its branches is one of the most vital functions of an Agricultural Department: that a large amount of its attention is devoted to this work, and that, in order that the farmers may reap the maximum benefit therefrom, it is essential that reports on experiments should be published about this period of the year in time for the coming planting season. Utility and a due consideration for public interests must over-ride any desire to make the *Journal* attractive in the popular sense.

Salisbury General Fertiliser.—The establishment of a new Rhodesian industry connected with agriculture is to be recorded in the manufacture at Salisbury of an artificial fertiliser now being offered to the farmers. Owing to the high prices of the article and the difficulty even of getting adequate supplies, this new enterprise is most timely and praiseworthy. The fertiliser has been duly registered in accordance with law, and the results of its use in the coming season will be watched with much interest.

An Acknowledgment.—We desire to express our regret that, by an inadvertence, the photograph of the bull "Lomond," winner of the thousand guinea trophy, was published in the August *Agricultural Journal* without due permission from the owners of the negative, Messrs. Smart and Copley. The fact of their ownership was not known to us at the time, and we wish now to acknowledge the source.

Salt.

Salt is apt to be wastefully fed to stock by strewing it on the ground or leaving it lying in the kraal. Considering the high cost of this necessary commodity, such wasteful practices are to be avoided. This may readily be done at next to no cost by taking short billets of any native wood growing on the farm, flattening one side and hollowing out a groove on the other large enough to contain a few pounds of salt. These salt trays cannot be upset, keep the salt clean, prevent waste, and are well worth using. Mr. H. D. Rawson, of Enterprise, has adopted this principle with success, and strongly recommends it. Incidentally we note a reduction of the railway rates on salt from Beira, which came into force on 1st October.

Beef Feeding Experiment

No. 2.

GOVERNMENT EXPERIMENT FARM, GWEBI.

By R. C. Simmons, Chief of Animal Industries Branch.

On 28th February, 1916, 24 bullocks were purchased from Messrs. Dimmock & Rawson for £7 5s. per head. They consisted of 12 half-bred Aberdeen Angus-Angoni bullocks and 12 half-bred Shorthorn-Angoni bullocks, all of good quality and in good condition. The Shorthorns shewed the characteristics of their breed, and were a really nice lot of feeders. The Aberdeen Angus were not all quite so good, and were in some cases scarcely two years old, and, therefore, rather small. The Shorthorns were, with one exception, older than the Aberdeen Angus, and were roughly about $2\frac{1}{2}$ years old. All were taken straight off the ranch, and had never been trained or artificially fed.

The bullocks were divided into three lots of eight, each containing four Shorthorn crosses and four Aberdeen Angus crosses, and were railed to Salisbury, and weighed on the 2nd and 3rd of March respectively. The mean weights being :—

Lot 1—6,200 lbs.

Lot 2—6,105 lbs.

Lot 3—6,050 lbs.

They were then, on the 4th March, re-railed to the Gwebi experiment farm, and dealt with as follows :—

Lot 1 were placed in a yard with a lean-to shed, for the purpose of being entirely confined to the yard until slaughtered

Lot 2 were yarded in the same way as Lot 1, but were to be grazed during the day on such fairly good grazing as might be found within a mile or so of the homestead.

Lot 3 were turned into a 1,000 acre paddock, together with some 40 head of native cows and dry stock, and were to receive no attention at all beyond dipping once a week at a spot one mile from the paddock. At this time the grazing was good, but with the arrival of frost in May, it fell off considerably. A rick of old veld hay was available at all times, and water was pumped daily into a trough.

For the first few weeks of the experiment, Lot 1 fretted somewhat, and possibly lost slightly in weight rather than gained. Lot 2, on the other hand, began to thrive right away from the start, and made excellent progress until the first week in May. Lot 3 also made some gains. In May, when the grazing fell off, Lot 1, being well on their feed, began to move away from the other two lots, and continued to hold the lead until the finish in July. Lot 2 did well, but did not make such fast gains as at first, and Lot 3 scarcely held their own. On 17th July the ages of all bullocks, as shewn by the teeth, were ascertained, and on 25th July they were railed into Salisbury and weighed. On 28th July Lots 1 and 2 were sold, but Lot 3 was returned to the farm for use in a further feeding experiment.

For the purpose of the experiment, calculations have been made up to and including 25th July, which made a feeding period of 144 days, or a little under five months. An amount of 5s. per bullock has been added to the original purchase as representing the average cost of railing a bullock from a grazing district to an agricultural farm, and a further amount of 5s. per bullock, representing railage, etc., has been added to the total cost of delivery in Salisbury. The actual expenses incurred in the course of collecting bullocks for an experiment have no bearing on the commercial aspect of the subject. The value of the manure, approximately two tons per beast, has been set against the labour of feeding, which it more than covers. The results were as shewn in the accompanying table.

BEEF FEEDING EXPERIMENT No. 2.

Group.	Total live weight at the commencement of experiment.	Average live weight per bullock at the commencement of experiment.	Total cost per group at Govt. Exp. Farm, including £2 expenses. £ s. d.	Final live weight per group.	Final average live weight per beast.	Total gain in live weight per group.	Average gain in live weight per beast.	Total dead weight per group.	Average dead weight per beast.	Average percentage of carcase to live weight per beast.	Sale price per group. £ s. d.	Sale price per 100 lbs. dead weight. s.	Cost of feeding for 144 days, per group. £ s. d.	Total cost per group delivered in Salisbury, including £2 railage, etc. £ s. d.	Profit on transaction per group. £ s. d.	Average age of bullocks in group at close of experiment.
1	6200	775·0	60 0 0	7935	991·8	1735	216·8	4624	578·0	58·27%	91 2 0	39·4	16 7 10	78 7 10	12 14 2	Not quite six teeth.
2	6105	763·0	60 0 0	7745	968·1	1640	205·0	4115	514 3	53%	81 6 0	39·5	10 16 2	72 16 2	8 9 10	Just over four teeth.
3	6050	756·2	60 0 0	6125	765·6	75	9·3	Returned to farm for further feeding.								Not quite six teeth.

The feeds in each case were :—

Crushed maize, valued on the farm at 3s. 6d. per bag.
Veld hay, valued on the farm at 7s. 6d. per ton.
Oat hay, valued on the farm at £2 10s. per ton.
Napier's fodder, valued on the farm at 5s. per ton.
Teff hay, valued on the farm at 12s. 6d. per ton.
Velvet bean hay, valued on the farm at 12s. per ton.
Green maize stalks, valued on the farm at 10s. per ton.
Majorda melons, valued on the farm at 5s. per ton.
Ground nuts (unshelled), valued on the farm at 4s. 6d. per 100 lbs.

Very little was used of either teff hay, oat hay or ground nuts.

The ration per day per beast was approximately as follows :—

Lot 1—

Period.	Grain. lbs.	Hay. lbs.	Succulents. lbs.
First	7.3	10.8	1.3
Second	12.0	10.4	6.3
Third	10.7	9.1	6.6
Fourth	12.0	12.8	5.1
Fifth†	12.0	13.7	14.6

Lot 2—

First	4.0	5.7	1.3
Second	7.7	5.6	2.5
Third	8.0	8.2	5.7
Fourth	8.1	10.2	3.5
Fifth†	8.0	11.8	9.7

It will be noticed that rather a large amount of succulent food was consumed in the last period, which is somewhat contrary to usual experience and recognised good practice. It is difficult to account precisely for this, but the increasing dryness of the weather as the season advanced may have increased the desire for more succulent food, and change of

†Including ground nuts.

teeth may have influenced the choice of feed. Also the endeavour to keep the cost of feeding as low as possible, by restricting the use of maize, may have resulted in less maize being consumed than might profitably have been made use of.

Deductions.—Considered in conjunction with a similar experiment carried out in the latter part of 1915, of which an account appeared in the February, 1916, number of this *Journal*, there appears to be an advantage in the shorter feeding period of 5 months as compared to $6\frac{1}{2}$ months, the result of this second experiment being pecuniarily more satisfactory.

A saving has been effected by the use of cheaper foods, avoiding mangels and more expensive rations of that kind.

It would appear that feeding and grazing combined in districts situated as is the Gwebi may prove very satisfactory from the time the grass re-appears till about May, but from the time that frosts cut down the veld there is a loss rather than an advantage in partial grazing, and it is more profitable to feed entirely in the stall in the winter months.

Beasts fed entirely in the stall may, when fit for the butcher, be reckoned to give at least 58 per cent. of carcase to live weight, and are, therefore, worth more per 100 lbs. of live weight than bullocks which are wholly or partially grazed.

The majority of the bullocks used in these first two experiments have been about $2\frac{1}{2}$ years old at the time of going on feed. It is probable that a greater profit would be realised from bullocks of 3 or $3\frac{1}{2}$ years old, as they would then have practically completed their growth, would have a larger frame on which to build up flesh, and would be more or less free from teething troubles.

It may interest the reader to know that further experiments are in progress with a view to ascertaining the feeding value of older bullocks of the class hitherto dealt with, and of comparing their feeding value with that of large framed

aged trek oxen of the type commonly met with in Matabeleland.

Acknowledgments are due to Messrs. A. W. Partridge, J. Symmonds, Logan, Bloom and others for their courtesy in kindly supplying the dead weights of bullocks bought on the hoof, and generally assisting to make it possible to carry out experiments such as the foregoing; also to the railway authorities, and especially to the Farmers' Co-operative Society, Salisbury, for valuable assistance in ascertaining the live weights, both of truck loads and of individual animals, before the experiments commenced, and after the fattening process was complete.

New Crops for Rhodesia.

Report on the experimental work conducted during the period 1915-16 *at the Botanical Experiment Station, Salisbury.*

By J. A. T. Walters, B.A., Assistant Agriculturist.

During the season under review, observations were made on over 300 experiments conducted with more than a hundred varieties of crops at the Salisbury experiment station. The following report will deal only with those experiments which have given definite conclusions or have supplied information of practical usefulness to the farmer. It is to be noted that in no case was manure or fertiliser applied unless expressly stated, and that the soil is fairly representative of the prevailing red soil of Southern Rhodesia.

The season opened well, but the drought, extending from the 23rd January to the 19th March, was disastrous to many of the short season crops and materially reduced the yields in almost every case, the most notable exceptions being majorda melons, peanuts and castor beans, all of which did exceptionally well, giving yields equal to or better than those obtained in seasons of normal rainfall.

MAIZE.

1. *Effect of a Previous Crop of Sunflowers.*—In order to test the reputed detrimental effect of sunflowers on a succeeding crop of maize, four separate plots were grown, two after peanuts and two after sunflowers. The results do not uphold the suspicion cast upon the sunflower as an exhausting crop, for in both cases increased yields were obtained after sunflowers:—

	A.	B.
After sunflowers ...	1,760 lbs. p.a.	2,130 lbs. p.a.
After peanuts	1,352 lbs. p.a.	1,040 lbs. p.a.

The yield on these plots, which have been seven years under cultivation, and are now bearing mealies for the first time, may be compared with the yield on second year land after a previous crop of wheat only:—

Land in its 7th year after various crops, 7.8 bags p.a.

Land in its 2nd year after wheat only, 5.4 bags p.a.

In both cases the effect of last season's drought was very considerable in reducing yields.

2. *Ensilage—Maize and Velvet Beans.*—A test to determine the best time to sow velvet beans with maize for ensilage purposes shewed that the beans, if sown at the same time as the maize, made good growth by the time the crop was ready for cutting, but the beans made a better growth when planted about a fortnight earlier than the maize. This latter plan, of course, involves a second planting, but the acreage put down to ensilage is never very great, and it is considered that the improved growth is well worth the extra trouble involved in two plantings.

3. *Propagation of Salisbury White Seed Maize.*—The Salisbury White variety in its origin represents an attempt to improve the yielding qualities of the Hickory King. The Hickory King variety has long ago proved itself to be remarkably suited to South African conditions, being highly resistant to blight (*Helminthosporum turcicum*), which readily attacks most other varieties, and being a good drought or wet season mealie, giving fair yields even under adverse circumstances. It has, however, neither the depth of grain of the Boone County variety nor the length of cob of the Natal White Horsetooth. Attempts to improve the Hickory King variety by crossing have been made by farmers in many parts of Rhodesia. In the Umtali district Boone County has been used for this purpose, and the excellent grain exhibited by Messrs. McLean & Howie is typical of this cross. Around Salisbury the Natal White Horsetooth variety was used, re-

sulting in the production of bigger cobs, but with shallower grain. In both cases the resulting cross has been called *Salisbury White.*

The seed now being propagated at the Salisbury experiment station, under the name Salisbury White, is a combination of all three varieties, produced as follows:—Both Boone County and Horsetooth were crossed separately with Hickory King in 1913-14. Next year the progeny of these crosses were crossed, so that the resulting seed in 1915-16 contained strains of all three varieties in the following proportion:- Hickory King, 50 per cent.; Boone County, 25 per cent.; Horsetooth, 25 per cent.

1913-14	H.K. × B.C.		H.K. × N.W.H.
		A	*B*
1914-15	50 per cent. H.K. 50 per cent. B.C.	×	50 per cent. H.K. 50 per cent. N.W.H.
		C	
1915-16	50 per cent. H.K. 25 per cent. B.C. 25 per cent. N.W.H.		

By careful selection, it is hoped to establish a fairly fixed type of 12-row cob, capable of producing high yields of deep grained cobs, and more suitable than the Hickory King to the richer regions of this Territory, such as the Mazoe, Shamva and Eldorado districts.

WHEATS, OATS AND BARLEYS.

The attempts to grow these cereals as summer crops are still far from being completely successful. The method employed during the last few years has been that of selection among a great number of varieties tried. The varieties under each heading represent the selection to date.

Wheats.—*Yellow Cross, Victoria, Bishop and Nlargius.* -Taking the returns over 23 plots, an average yield of only 182 lbs. per acre was obtained, while the average yield from 9 plots of the Yellow Cross variety alone gave 270 lbs. per

acre. The best yield was 400 lbs. per acre on one plot of Yellow Cross. Our experiments would seem to shew that Yellow Cross is a distinctly superior variety to any others, being fairly rust-resistant, early, and producing a comparatively plump grain.

Rate of Sowing.—Each variety was sown in separate plots at the rate of 40 to 60 lbs. per acre respectively. The results this season shew conclusively that the lighter sowing was sufficient on the red soils of this country. In five cases out of seven a heavier yield was obtained from the sowing at a rate of 40 lbs. per acre, and in the remaining two cases 60 lbs. per acre only gave a very slightly increased yield.

Cross-bred Wheats for Rust-resistance.—In no case have these hybrids—produced by crossing Victoria wheat with other varieties with superior grain—given yields equal to those obtained from the Yellow Cross variety. As these have been under trial for five years, it is not proposed to proceed any further with them. They represent a failure to improve the grain quality of a rust-resistant variety (Victoria wheat) without impairing its natural resistance to rust.

Ploughing Trial.—Early and frequent ploughings seem to have far less effect upon wheat than upon maize. This is probably due to the fact that wheat is planted later than maize, when the seed bed has had the benefit of the early rains.

Oats.—Seven varieties of oats were tried, three early (Kherson's 60-day, Sidonian and Burt), two medium (Grayside and Smyrna) and two late (Texas and Algerian), representing the strains that have consistently done best out of a great many trials. Sowings in each case were made early in January, and growth was satisfactory until checked by the February drought, which had the effect of retarding the maturity in each case. Thus the 60-day oat was not ripe by the middle of April, at which period it had to be cut for hay on account of the rust. Mr. Mundy has pointed out in his article on "Oats in Rhodesia" how these early varieties depend for their immunity upon escaping the fungus owing to rapid maturity. Owing to the drought and subsequent rust, yields of forage and grain were disappointing, the best

grain return being two bags (240 lbs.), and the best forage return only 1,100 lbs. per acre. The position with regard to summer oats may be summed up by saying that, with certain varieties in good seasons, payable returns of both grain and forage may be obtained, but that under adverse circumstances the crop is apt to be a failure.

Barleys.—One malting variety (Hanna) and one feeding variety (Beardless and Nepal barley) were tried. As in the case of oats, the unfavourable season was responsible for the failure of a crop that seemed promising. The plant growth was good, although late, and a fair amount of hay would have been obtained. The crop was saved for seed, and only 140 lbs. per acre was harvested. The malting barley was a failure.

Apart from the above experiments, trials are being carried out with the leading South African and Australian varieties of wheat as winter crops under irrigation. These are being compared with Early Gluyas, in order to find out if any other varieties warrant extended trial, Early Gluyas being at present almost the only winter variety used in Rhodesia.

OTHER CEREALS.

Kaffir Corn.—Four varieties were tested, Feterita, Red, Sapling and Yemens. As a drought-resister this crop proved extremely successful. The loss by birds was, as usual, very considerable. An attempt to avoid this was made by bending the heads over without breaking the stem. This did not prove efficacious. The best yield was obtained from the Yemen variety, which gave 1,440 lbs. per acre. The Sapling variety was later than any of the others. Red kaffir corn was earliest, and was harvested in four months from date of sowing. It also yielded the lightest crop, at the rate of 754 lbs. per acre.

Buckwheat.—One of the best features of this crop is its utility as a catch crop. It may be sown from the first rains until February. A sowing on the 4th March was, however, found to be too late. Like most early-maturing crops, it suffered severely from the drought, the January sown crops yielding only 288 lbs. to the acre. A crop sown in February, which did not germinate until the March rains, gave 600 lbs. per acre. This gives a good indication of the possibilities of the plant as a catch crop.

Millets.—In addition to German millet, two varieties—Caucasian and Californian—are under trial. Both are reputed to be earlier than the varieties now usually grown.

OIL CROPS.

The following oil crops were tried during the present season:—Peanuts, castor beans, sunflowers, linseed, guizotia, sesamum and Chili oil seed (*Madia sativa*).

Peanuts.—The principal test carried out with peanuts had for its object the discovery of some means by which a more uniform stand of plants in the field could be obtained. In certain years serious loss has occurred through misses in the rows. By sowing two seeds in a hill, with the hills 12 inches apart, an almost perfect stand was obtained. The rows in each case were 30 inches apart. Yields obtained from this method of planting were as follows:—

Spanish	1,600 lbs. per acre equals	20 bags.
Virginia Bunch	1,810 lbs. per acre equals	22.6 bags.
Carolina	1,244 lbs. per acre equals	15.5 bags.
Tennessee Red ...	1,280 lbs. per acre equals	16 bags.

The amount of seed required per acre in this case was 40 lbs. shelled nuts—Spanish variety. One bag of unshelled nuts will suffice for 1½ acres.

The next best method of planting was single nuts (shelled) every 12 inches. This gave a yield of 1,688 lbs. per acre in the case of Virginia Bunch ground nuts. Planting whole pods 12 inches apart gave only 722 lbs. per acre, but cracked pods at the same rate gave 1,250 lbs. per acre. In the case of uncracked pods, there were 40 per cent. misses in the row, and when these were examined, it was found that the nuts had rotted in the pods.

Castor Oil Beans.—One of the principal objections to growing this crop is that it continues to ripen its pods for about six months May to October—during which time it is necessary to harvest the heads every fortnight or so, as they ripen. If this is done systematically, the yield produced per acre is not inconsiderable. Harvesting by this method is now in progress at the Salisbury experiment station over five plots

of castor beans, in order to determine the best yield that may thus be obtained.

Varieties of Castor Beans.—As many as eight varieties, differing in colour, size and markings, were sown separately, to see if each bred true to type. The resulting seeds resembled the parent type in every case. As these plants were grown in close proximity last season, another test will be made this season to determine how readily the different varieties cross with one another.

Sunflowers.—The black variety only was used. This was sown as follows:—(a) 42 in. by 18 in., (b) 36 in. by 12 in. In spite of the dry conditions, the closer sowing seemed to give sufficient growing room to the plants, and a yield of 1,350 lbs. (13½ bags) per acre was obtained. The wider sowing only gave 1,100 lbs. per acre.

Linseed.—The February drought proved disastrous to this crop. With the March rains a new growth was made, and seed heads formed afresh. The yield was very light, however, and no weights were taken.

Guizotia or Niger Oil Seed.—This crop is thoroughly acclimatised here, and grows freely without re-sowing. No satisfactory method of harvesting has yet been devised.

Sesamum or Gingelly Oil Seed.—This native oil crop gave great promise early in the season, and the yield of 240 lbs. per acre by no means represents its possibilities under normal conditions.

Madia Sativa or Chili Oil Seed.—This was tried for the first time from seeds from the Cape Province, and shewed considerable promise.

LEGUMES.

Dhal.—Under the conditions obtaining at Salisbury, dhal is only slightly affected by frost. This is probably due to the shelter from winds which is provided, as temperatures of 15 below freezing point have been recorded at the experiment station. A plot of dhal in its fourth year gave a yield of 600 lbs. per acre. A great many of the plants have died out since the first year, but the stand is still sufficiently full to war-

Guinea Grass (*Panicum maximum*) at Salisbury Experiment Station.

Jack Bean (*Canavalia ensiformis*) at Salisbury Experiment Station

rant its retention for another season. A third year plot yielded 500 lbs. per acre, and a second year plot on new ground gave 778 lbs. off ¾ acre (equals 1,037 lbs. per acre). Mottled dhal is a more vigorous grower than the ordinary variety, but is still later and more uneven in maturity. A second year plot of this kind gave a return of only 280 lbs. per acre, harvested towards the end of August.

Velvet Beans.—This long season crop requires to be sown early, in order to ensure a good return of seed. For hay purposes, it may be sown as late as mid-January. When the whole crop was cut for hay, a return of 2,730 lbs. hay per acre was obtained. The seed crop suffered considerably from the unusually early frosts in May, and the best yields did not exceed 380 lbs. per acre, with an average of 250 lbs. per acre over nine plots. In the case of a new black seeded variety, called the Bourbon bean, this proved to be so late that no flowers were formed by May, when the whole plot was cut down by frost.

Closely resembling the velvet bean as a fodder plant, is a new introduction known as the Hyacinth bean (*Dolichos lablab*), producing a stringless pod, which is highly valued as a vegetable. This proved to be as early as the velvet bean, but, like this latter crop, it was partly damaged by the early May frost, and a good deal of the seed was lost.

Cowpeas.—The variety trials, consisting of five varieties that had given promise in the past, proved a complete failure this season. The Natal black variety, on the contrary, gave an average of 438 lbs. of seed over five plots—a higher yield than has usually been obtained in the past, but low compared with that of other countries, and, taking into consideration the high cost of harvesting, this crop cannot be generally recommended.

Beans.—Canadian white and red gave yields of 200 and 120 lbs. per acre respectively, in spite of a thicker sowing than usual, viz., about 60 lbs. per acre. Although this crop is frequently fitted in in farm rotations, it is exceedingly doubtful whether payable returns are often obtained.

Vetches.—These were tried as a summer hay crop sown with teff grass and with German millet, with the object of

improving the hay crop by the addition of a legume. In neither case did the vetches come to anything, although a good growth was produced by the teff grass and the millet. Vetches were also tried as a winter fodder crop under irrigation. Early growth was satisfactory in this case, but the light weight of the fodder obtained did not justify the outlay involved.

Peas.—The poorness of the best yield, only 156 lbs. per acre, was probably due to the drought. The variety grown was Ringleader. It cannot be said that the pea has been established as a field crop in this country, as good returns are only obtainable under favourable conditions. The best early varieties so far tried are Ringleader and Fillbasket, and the best lates Solo, Maincrop and Capital.

Clovers.—The only summer clover now grown is the annual Egyptian variety Khabrawi. Both plant growth and seed production were satisfactory at the experiment station this season. The seed used was our own. The imported seed introduced some years ago contained a very high percentage of wild chicory, which proved a troublesome weed. It is hoped to have clean seed for distribution in the near future.

Beggar Weed.—This crop continues to give satisfaction, grown either as a pure crop or in alternate rows with Napier's fodder. The roots penetrate deeply, and form nodules, and the plant seeds freely.

ROOT CROPS.

In general, root crops do well in this country, particularly on soil that is not heavily clayey. The only exception to this rule is the class of cruciferous root crops, such as turnips, swedes and kohl-rabi, which do well as far as climatic and soil conditions are concerned, but are subject to the attacks of a host of insect pests.

Mangels.—Four varieties were tried, and the yield can be regarded as highly satisfactory, considering the season. Mangels are, however, well known to be good drought-resisters, and the only one that suffered was the Half Sugar variety, which is a cross between the mangel (*Beta vulgaris macroshiza*) and the sugar beet (*Beta vulgaris*).

	1916. (After Wheat.)	1915. (After Egyptian clover.)
Mammoth Long Red ...	15.5 tons	11.8 tons per acre
Golden Tankard	9.9 tons	
Yellow Globe	3.2 tons	10.2 tons per acre
Half Sugar	2.5 tons	12.4 tons per acre

Kraal manure was applied to the land, and ploughed in at the rate of six tons per acre.

Chicory.—Owing to the war there has been a considerable shortage in the world's supply of this commodity, and a consequent rise in market value. But little of this crop has been grown up to the present in Rhodesia, mainly perhaps because of the small attention that has been paid to side crops. The usual rotation for this crop in Europe is a previous crop of wheat or potatoes, manured. Kraal manure is never applied directly to chicory. Two plots were tried this season at the experiment station, and the yields of fresh root are as follows:—

After wheat	10,120 lbs. per acre
After roots (manured)	9,900 lbs. per acre

Previous weights have amounted to as much as 9 tons per acre under a rainfall of 23 inches. By sun drying, chicory can be reduced to one-fourth of its weight, in which state it is usually transported to manufacturers.

Carrots and Sugar Beet.—The germination obtained from two year old seed was very indifferent, and previous experience, especially with mangel seed, would seem to shew that in almost every case imported seed should be obtained as fresh as possible.

Sweet Potatoes (Batatas edulis).—The improved American variety continues to give satisfactory results, and, if planted early, the crop can be lifted at the end of the same season.

Yams (Dioscorea batatas).—These continue to make satisfactory growth, but without giving the heavy yields that are obtained elsewhere.

Plectranthus edulis.—A native crop, producing smallish tubers in fair quantity, but hardly a sufficient yield to warrant its adoption by farmers.

HAY CROPS.

The practice of mixtures for hay crops has been largely developed in America, where it is usual to include a legume, with the object of improving the ration and the yield. The failure of vetches in such a mixture has already been noted. The effect of mixing millet and teff seems, however, to have been quite satisfactory, although too much importance should not be attached to the figures, in view of the scanty rainfall during the growing season, which made second cuttings impossible.

Teff alone	1,200 lbs. hay per acre
Millet alone	1,890 lbs. hay per acre
Teff and millet mixed ...	2,300 lbs. hay per acre

The seed sown per acre was 8 lbs. teff alone; 10 lbs. millet alone; 4 lbs. teff and 6 lbs. millet mixed respectively.

ROTATION EXPERIMENTS.

A series of careful trials in rotation are being made for the prevailing red soil of this country. The index crop is maize, and the value of any system of rotation is measured by its effect upon this crop. Definite results will not be available for some years, but a few results are sufficiently interesting to warrant publication at this stage. Thus, by growing maize continuously on unmanured land for three years, the yield had fallen this last season to $5\frac{3}{4}$ bags per acre; while on land fallowed in alternate years, the yield was slightly over 9 bags per acre. In a rotation including wheat (1914) and velvet beans (1915), the yield reached 10 bags per acre. In a favourable season last year almost the same ratio was obtained, viz., maize continuously, 9.4 bags per acre; maize alternately with fallow, 14 bags per acre; maize after wheat, 16.7 bags per acre.

WINTER PASTURE PLANTS.

In addition to Napier's fodder (*Pennisetum purpureum*), the following grasses and legumes are under trial:—Mfutu grass, sugar cane, Sudan grass, Guinea grass (*Panicum maximum*), molasses grass (*Melinis minutiflora*), two native

Feterita Kaffir Corn at Salisbury Experiment Station.

Beggar Weed (*Desmodium tortuosum*) at Salisbury Experiment Station.

grasses (both *Panicum spp.*), Indian cane (*Sorghum sp.*) and cow cane (*Sorghum sp.*); dhal (*Cajanus indicus*), beggar weed (*Desmodium tortuosum*) and goat's rue (*Galega officinalis*). In the case of all these plants a certain measure of success has been attained, and in some cases, such as Indian cane, cow cane and molasses grass, it is hoped to be able to distribute rooted slips in the near future, as these grasses provide in some measure for needs not hitherto supplied.

In addition to the above, a series of experiments have been conducted with pasture plants under irrigation. The principal of these is lucerne. One of the essential requirements in lucerne growing is depth of soil, or at least a porous sub-soil through which the tap root can penetrate easily. This condition, as a rule, is not met with in the red soils of Rhodesia, excepting only occasionally in alluvial pockets on the banks of rivers, and the present trials have amply brought out the difficulties likely to be experienced with lucerne, on account of the clayey sub-soil underlying almost the whole of our red soils. The effect of such a sub-soil is two-fold. It prevents irrigation water from passing freely below the surface, and it makes it impossible for the lucerne tap root to penetrate to any considerable depth. Applications of lime and artificial manure proved of little avail in establishing the crop, but it is worthy of note that of 21 varieties tried, some shewed far greater promise than others.

Sulla (*Hedysarum coronarium*), Bokhara clover (*Melilotus alba*) and serradilla (*Ornithopus sativus*) made fair growth under irrigation, but practically failed under dry conditions. Beggar weed (*Desmodium tortuosum*) and goat's rue (*Galega officinalis*) did well under both conditions. Of all these legumes, beggar weed has consistently given the most satisfaction, and can safely be recommended for inclusion in a pasture mixture, being a hardy and deep rooted perennial and prolific seeder.

FIBRE PLANTS.

The Mauritius hemp (*Furcraea gigantea*) and sisal hemp (*Agave sisalana*) plots are now in their seventh year. The sisal hemp plants started poling last year, and the Mauritius hemp plants are poling this season. As this opera-

tion marks the end of the useful life of these plants, it is worthy of note that the Mauritius hemp has an advantage over sisal in the duration of its productive period, which generally starts in both cases when the plants are three years old. New Zealand flax (*Phormium tenax*) did not thrive as a red soil crop, probably owing to the dry conditions, to which it is not suited, and has been moved to a more favourable position. None of the plants has ever flowered. Ramie (*Boehmeria nivea*) grows well, spreading and seeding profusely. Of the hemp varieties (*Cannabis sativa*), only two have made satisfactory growth in a series of trials. These are Chinese hemp and Piedmont hemp, and seed of both are being saved for further and more extensive trials.

RECENT INTRODUCTIONS.

Grasses.—Side oats grass (*Doutelova curtipendula*) from the United States, Mitchell grass (*Astrebla triticoides*) and Blue grass (*Andropogon sericeus*) from Australia—all valuable pasture and hay grasses in their country of origin—have not given satisfaction under Rhodesian conditions, although in each case seeds are set freely. New Zealand tall fescue (*Festuca elatior*) has failed entirely. *Phalaris bulbosa* and Sudan grass (*Andropogon sorghum*) do well even as winter grasses under favourable conditions.

Legumes.—Two varieties of velvet bean (*Mucuna utilis*), one black seeded and one almost white seeded, were tried last season without success, no seed being set in either case before the frosts cut down the plants. Sword bean (*Canavalia gladiata*) and Jack bean (*Canavalia ensiformis*) have done remarkably well under cultivated conditions. Both these are indigenous tropical plants, and the former is highly prized by American agriculturists as a vegetable, the pods being used in the green stage. The Tepary bean was a complete failure. *Sutherlandia frutescens* grows vigorously and flowers profusely during the dry winter months. Cattle do not, however, seem to care for the foliage. Tagasaste (*Cytisus proliferus*) continues to make but poor growth, and the plants steadily dwindle in number. Tree lucerne (*Medicago arborea*) sown this last season has germinated fairly well, but has made no considerable growth. Both

Tagasaste and tree lucerne thrive under certain favourable conditions in this country, but are far from satisfactory under ordinary conditions on the red soils. Some lupin transplants gave exceedingly satisfactory results in a plot, and it is hoped that this plant will prove of considerable value as an orchard green manuring crop. The sunshine bean from the Cape Province turned out to be the Jack bean.

Miscellaneous.—Both saffron (*Carthamis tinctorius*) and coriander (*Coriandrum sativum*) have proved to be suited to Rhodesian conditions, and seed well. *Chenopodium amaranthicolor* grows and spreads freely, and is useful as a fodder and as a spinach plant for table purposes. A plot of Makamaan melons gave very satisfactory returns, amounting to 1,800 lbs. weight of melons off $\frac{1}{4}$ acre. Seeds of this plant will be available for distribution this season. It is reputed to be an excellent vegetable in the green stage. Chillies (*Capsicum spp.*), after a failure during the drought, recovered with the March rains, and gave a small return. Mazagua (a West African variety of kaffir corn) failed to realise expectations, being a prey to a great variety of field pests. Globe artichoke seed (*Cynara scolymus*) from Europe failed to germinate. Salt bushes (*Atriplex spp.*) were again a complete failure. In the case of a great many other introductions, definite information will only be available after further trial.

Immunity

IN ITS RELATION TO THE STOCK DISEASES OF SOUTHERN RHODESIA.

By L. E. W. Bevan, M.R.C.V.S.,
Government Veterinary Bacteriologist, Southern Rhodesia.

The study of immunity covers so large a field, that the present review must needs be limited to the discussion of the subject in its more restricted sense, namely, resistance to infective diseases, and especially those which affect the animal industry of this country.

From this standpoint, the term "immunity" may be defined as "the resistance against infection with vegetable and animal parasites and their products, which are pathogenic for other animals of the same or of different species" (Kolmer), or in the words of the great scientist Metchnikoff, to whom our present knowledge of the subject is so largely due, "immunity against infective diseases should be understood as the group of phenomena in virtue of which an organism is able to resist the attack of micro-organisms that produce these diseases."

That the body is capable of resisting, or being brought by artificial means to resist, harmful influences is no new conception in the history of medicine. Hippocrates taught that the cause of a disease is also capable of curing it—*similia similibus curantur*—practically the principle upon which modern vaccine treatment is based. Pliny the elder recommended the livers of mad dogs as a cure for hydrophobia. In mythology Telephus is supposed to have cured his wound by applying rust from the sword which inflicted it; and Mithridates, King of Pontus (B.C. 120), is said to

have immunised himself against poisons by drinking the blood of ducks that had been treated with the corresponding toxic substances.

For generations savage races have been in the habit of protecting themselves against snake-bite by means of the venom extracted and administered in different ways; and it is said that in Senegambia there existed a custom, the origin of which is lost in the obscurity of antiquity, whereby cattle were protected against pleuro-pneumonia (lung-sickness). De Rochebrune gives the following description of the process:— "The point of the knife of primitive form, or of a dagger, is plunged into the lung of an animal that has died from the disease, and an incision, sufficient to allow the virus to penetrate below the skin of the healthy animal, is made in the supranasal region. Experience has demonstrated the success of this operation." The existing method of protective inoculation against this disease is but a slight advance upon this primitive method.

Different methods of vaccination against small-pox have been employed since the earliest times. The Chinese are said to have known of the practice since the 11th century, and undoubtedly the natives of this country resorted to it long before the advent of the "white man." The more exact study of the process by Jenner did much to bring about the present knowledge of the principles of immunity. For a long time it had been known by the country folk in Gloucestershire that infection with cow-pox protected against small-pox, a fact which Jenner explained on the supposition that cow-pox was a modified form of small-pox, rendered practically harmless to human beings by its passage through a lower animal.

Next in the field came Pasteur, whose work in connection with fowl-cholera, anthrax and rabies did much to extend the knowledge of the possibility of conveying protection against diseases by artificial means. More recently Metchnikoff has explained many of the problems of immunity; and further light has been shed upon the subject by Ehrlich, Bordet, Wright and a host of other workers. Nevertheless, even at the present time the true explanation of the phenomena which make up this marvellous power, whereby the organism can of

itself build up the means to resist the harmful influences which constantly assail it, has yet to be found.

Although, for the purposes of this review, the definition of immunity as "resistance to the attack of micro-organisms" has been accepted, it must be pointed out that the animal body is capable of opposing many harmful influences, physical, chemical and mechanical, capable of producing diseases. For example, the pigmentation of the skin and hair of animals and man in tropical countries affords protection against the injurious rays of the sun; the horny hand of the Rhodesian settler protects him from the friction of his implements of toil. The habituation of cattle regularly dipped to solutions of arsenic, which would "scald" animals immersed for the first time, is an example of immunity acquired against an otherwise harmful chemical substance.

Again, the definition is limited to micro-organisms, although immunity may be observed against organisms of comparatively large dimensions. The comparative freedom of indigenous cattle from ticks, the resistance offered by fat sheep to mange and scab, the tolerance of "well-conditioned" animals to intestinal parasites in numbers which might be expected to kill, are practical examples of immunity. It is true that in these cases the apparent resistance will under adverse conditions break down, but as M'Fadyean points out, "When an animal is said to be immune against a particular disease, one merely means that it offers such a degree of resistance to infection by that particular organism as safeguards it from all natural and reasonable risks."

The micro-organisms which cause infective diseases may belong to the animal or vegetable kingdoms, or may be so little understood that they cannot be classified with certainty in any of the great groups. As examples of the animal parasites, the protozoa which give rise to African coast fever, redwater, gall-sickness, fly-disease (trypanosomiasis) of cattle, biliary fever of equines, or malaria of man, are of local importance. Belonging to the vegetable kingdom are the moulds and fungi, and the bacteria which form the lowest group of vegetable life. Ring-worm and the disease of horses and mules, locally known as "pyæmia" (epizootic lymphangitis), are examples of fungoid diseases; while contagious abortion,

glanders, tuberculosis, anthrax, quarter-evil, tetanus, strangles, are caused by bacteria. Horse-sickness, rinderpest and rabies are well-known diseases caused by parasites of the third group, which are so small that they cannot be seen by the employment of the highest powers of the microscope, and are of such minute dimensions that they can pass through the pores of a filter of the finest porcelain.

"Infection is the successful invasion and general growth of micro-organisms in the tissues of the body." This invasion may take place through the skin as the result of wounds, or by means of inoculation by suctorial insects, or by way of the digestive or respiratory tract, and occasionally through the genital organs. Generally speaking, however, infection must have occurred before immunity can be acquired; it is the stimulation afforded by the infecting agent which brings about re-action resulting in resistance.

Many of the micro-parasites are strictly parasitic, and can only multiply and maintain their existence in the living animal body; others, again, while capable of existence outside, may invade the body of an animal and become established there.

The manner in which parasites may give rise to disease may be well explained by taking as an example the disease of cattle known as African coast fever. This is transmitted by ticks, which, apart from the specific micro-organism they transmit from sick to healthy animals, are harmful by reason of the irritation and discomfort caused by their presence, and by the injury inflicted by their bite. In addition, by robbing the host of blood, they set up a condition of anaemia and debility which predisposes their victim to invasion by other parasites, such as bacteria, which, if in a better state of health, it would be able to resist. Now the "Brown tick," which in one stage of its life cycle has fed upon an ox infected with African coast fever, and has taken up in the blood the causal parasites of that disease, is capable in the next stage of its development of introducing those parasites into the susceptible animal upon which it feeds. These parasites make their way into the internal organs of the infected animal and multiply. Frequently they become lodged in the minute capillary blood-vessels, and by obstructing the flow of blood bring about the

death of the tissues thus deprived of nourishment. Again, making their way into the general circulation, these minute parasites not only break down many of the blood elements and live at the expense of the host, but actually poison it by the toxins which they produce.

Thus we see that parasites may bring about disease in one or more of the following ways:—(1) By their mechanical effects, (2) by robbing the host of nutritive material, (3) by the production of noxious substances.

Of these three methods, the third is perhaps the most important, and special reference must be made to these poisonous substances or *toxins* which may be bound up within and only liberated by the disintegration of the micro-organisms (endo-toxins), or may be secreted by them into the living tissues or into culture media upon which they are made to grow artificially (ecto-toxins). The actual nature of these toxins is not known; in many respects they resemble the ferments or diastases, inasmuch as they act in very small doses, are soluble in water and in glycerine, are weakened by filtration, and are sensitive to heat, light and various chemical substances. When inoculated into the body, they only manifest themselves after an interval, or period of incubation, which varies according to the quantity and the path by which they are introduced. One of the toxins which has been most closely studied is that of tetanus (lockjaw), a small quantity of which can kill 20 to 100 million times its weight of living animal; thus a horse may be killed by 1/80,000 of its weight of tetanus toxin, because the poison acts in an elective fashion on a particular group of cells in the medulla of the brain. "The fact that in certain animals, man and horses, tetanus always begins by contraction of the muscles of the jaw (lockjaw) only means that, even after a stab or wound of the end of a limb, sufficient toxin passes sufficiently quickly into the circulation to affect the *centres* on which the innervation of these muscles depends" (Burnet). The fixation of toxins by certain cells is comparable to a dyeing process. Thus, when silk is placed in a solution of picric acid, it will "select" or take up as much as 1.3 per cent. If a mixture of silk and cotton is placed in the solution, the silk will be dyed but not the cotton. Certain plants possess the same "selective" powers, and can

absorb copper from solutions containing only one in 100,000,000. Sea-weed will "select" and concentrate the iodine which exists in sea water in minute traces. It has been shewn that when tetanus toxin is mixed with an emulsion of brain substance in saline solution (0.8 per cent.), after a time the tissue fixes the toxin, and the liquid is no longer toxic. This, however, is not due to any destruction or neutralisation of the toxins, because the brain substance will give up the toxin when allowed to macerate. It is the power of selective fixation which explains the sensitiveness of an animal to a particular toxin. The fowl is highly refractory against tetanus toxin, and will only evince tetanic symptoms when enormous doses are injected subcutaneously; but small doses will set up tetanus in a fowl previously weakened by immersion in water; while one milligramme of the toxin will provoke the disease when injected direct into the brain. The alligator, which is refractory to tetanus, retains in its blood for more than a month the toxin which was injected into it.

The actions of a toxin may be modified by body temperature. Thus "the frog, which is refractory to tetanus in winter, or when kept at a low temperature, takes tetanus in summer, or when kept in an incubator at about 30 degs. C. At this temperature the poison disappears from the blood and organs much more quickly than in the cold. The course of the tetanic symptoms can be interrupted at will in the frog kept in an incubator, by putting it again at a low temperature. In this way the phenomena may be suspended as long as the chilling continues; if it is again put in the incubator, the symptoms re-commence at the stage at which they were interrupted. In the frog, fixation and response are, therefore, to a certain extent dissociated, for in the cold the toxin is fixed by the cells, yet the disease does not appear" (Burnet). It is also interesting to note that the marmot, while insusceptible to tetanus toxin during its winter sleep, will readily contract it when awakened.

These points have been introduced at some length to emphasise the importance and peculiarities of toxins in the production of disease; in fact, in the great majority of diseases they play the most important part. They are also of great importance in the study of immunity, because resist

ance against a micro-organism is not the same as immunity against a toxin—a fact which has an important application. Closely allied to the toxins are the venoms excreted by scorpions, spiders, certain insects and snakes, while similar substances can be extracted from the higher plants, as for example ricin from the seeds of the common castor oil plant, and abrin from the jequirity.

The fundamental difference between the toxins and poisons of known chemical composition lies in the fact that the former alone, when introduced in suitable doses into the animal body, give rise to *anti-bodies*, which are the specific products of a re-action of the body against infection.

In all infections, two factors have to be considered, the offensive power of the infecting agent and the resistance of the host. There is a constant struggle between the one and the other; not only does the body defend itself against the parasite, but the parasite defends itself against the body; each is capable of gathering strength and immunising itself against the other. The disease-producing power of a micro-organism is referred to as its *virulence*, and this may increase or decrease, according to the suitability or otherwise of the conditions offered it for growth. Often a parasite of comparatively low virulence will gain in strength when introduced to an animal offering a low degree of resistance or presenting favourable nutritive material. Thus, for example, the parasite of fly disease is capable of existing in the game of the tsetse fly areas, but apparently causes no harm to them: but when transferred by the fly to man or to his domestic animals, it gains in virulence, and sets up a serious disease rapidly causing death. This particular parasite, or trypanosome as it is called, is susceptible to arsenic and antimony, which if applied at the right time and in proper doses, will lead to its disappearance: but if the drug is applied in insufficient quantities actually to kill the parasites, they will again return to the peripheral circulation of the animal, and when the remedy is again applied will offer a marked resistance to it, having become immune against it. A remarkable fact is that if these arsenic-resistant parasites are transferred to and set up disease in another animal, the descendant strain will also prove resistant. The virulence of an organism may increase

or become exalted, or become reduced or attenuated by passage from animal to animal. Thus, rabies gains in strength when passed through a series of rabbits, but becomes attenuated when passed through monkeys. The attenuation of micro-organisms as a means of vaccinating and so conferring immunity will be referred to later in greater detail.

Having briefly discussed the causes of disease, we are now in a position to consider more fully nature's means of resisting them, which constitutes immunity. In the first place, two sorts of immunity are recognised, the first known as natural or inherited, and the second as acquired.

"*Natural immunity* is the resistance to infection normally possessed, usually as the result of inheritance, by certain individuals or species under natural conditions" (Kolmer). Examples of immunity belonging to a whole species are seen in the resistance of man to certain diseases of the lower animals, and, conversely, in the immunity of animals to the diseases of man. Again, animals of one species are immune to the diseases which affect another; thus, bovine animals are resistant to horse-sickness, while on the other hand equines are resistant to rinderpest, African coast fever and red-water, diseases of cattle. Natural immunity may also be possessed by certain breeds of animals, *e.g.*, Algerian sheep to anthrax, Persian sheep to heart-water.

Acquired immunity also may be "natural," from the fact that it is established as the result of spontaneous cure from an infective disease, but often it is the result of direct human intervention as by inoculation or vaccination. Two sorts of acquired immunity are recognised, active and passive.

Active immunity is acquired as the result of an animal having survived an attack of the disease in question, or is brought about by artificial inoculation with a modified or attenuated infection. As a result, anti-bodies are produced and continue to be produced, so that the immunity is more or less permanent or active for a considerable period. It is strongest immediately after recovery, but may last for many years. It is generally specific, that is to say, protects only against the diseases which caused it.

Passive immunity, however, may be conferred by injecting into a susceptible animal serum or other protective pro-

ducts from another animal which has itself recovered and has thereby acquired active immunity against the disease. The anti-bodies thus supplied become used up or excreted, so that the immunity is passive, that is to say, passes away. Generally speaking, passive immunity is acquired immediately, and with little or no risk, but is of brief duration, and rarely serviceable after a month.

A form of immunity of special importance in this country is that known as "tolerance," whereby certain microparasites and their host may live together in apparent harmony, owing to the ability of the host to restrain the activity of the parasite and to neutralise its injurious effects, or to an absence of infectivity on the part of the parasite. When, however, the balance between the two is disturbed, the parasite may become more aggressive, and the resistance to it may break down. This may be brought about by many causes which reduce the vitality of the host, such as starvation, overwork, severe climatic conditions or faulty hygienic surroundings. The tolerance of the game to trypanosomes, causal parasites of the so-called "fly disease," has been referred to, and a similar condition sometimes occurs in cattle which have not been severely infected. Thus cattle from the north which have been hurried through the "fly belts" may remain apparently healthy for many months, but will rapidly succumb when exposed to the first rains, which often follow a period of severe drought and a scarcity of grazing.

Again, most indigenous cattle harbour the red-water parasite, which is comparatively harmless to them until their resistance is reduced by some concomitant disease, such as African coast fever or rinderpest.

The question which now arises is, what are the active factors in the production of immunity? Several theories have been advanced, none of which offers a complete explanation. The first was the *Exhaustion Theory*, which assumed that certain nutritive or other substances essential for the growth of a parasite became used up during the first attack of the disease. This theory was at one time held by Pasteur, but when it was found that certain bacteria could grow perfectly in the blood of animals possessing complete immunity, and that an animal

resistant to a few bacteria would often succumb to a greater number, it could no longer be accepted.

Another explanation advanced was the *Retention Theory*, which was based upon the knowledge that the fermentation of certain yeasts would stop as the material acted upon became over-charged with the products of the process; and it was thought that the development of micro-parasites might be rendered impossible by the presence of certain excremental substances thrown off by them; but the fact that the micro-organisms can be cultivated upon artificial media prepared from the tissues of an animal completely resistant to them during life renders the theory untenable.

In 1883, Metchnikoff shewed that certain of the living body-cells, and particularly varieties of the white blood-cells, played an active part in defending the body against the invasion of micro-parasites. This theory was known as the *Theory of Phagocytosis*, and the cells most active in the process were termed phagocytes, that is, cells which eat, because they were capable of picking up and disposing of offensive material. By studying the action of such cells under the microscope, it was found that they were capable of ingesting and destroying non-pathogenic bacteria, but that they were repelled by certain disease-producing organisms to which the animal was susceptible. But if the phagocytes were taken from an animal possessing immunity to the disease, they were capable of dealing with the parasites as if they were ordinary harmless micro-organisms. The manner in which the repulsion, or negative attraction, was converted into a positive attraction was not clear, and the theory had to be considerably modified, although the process is still recognised as one of the chief factors in the mechanism of resistance and recovery from certain infections.

Opposed to this theory was the *Humoral Theory*, which attributed the destruction of invading organisms to an extra-cellular process brought about by substances in solution in the blood or tissue juices, that is to say, to the action of chemical substances in the humors or fluids of the body, as distinct from the cells themselves. "The humoral theory first took the field with claims or aspirations to be a chemical theory, when some at least of the phenomena of immunity

were successfully reproduced outside the body in the test-tube" (Burnet). Without disputing the importance of such observations, Metchnikoff pointed out the fallacy of drawing deductions from the behaviour of cells and body-fluids when removed from the body.

The *"Side-chain" Theory* of Ehrlich was a modification of the humoral theory presented in such a plausible manner as to tempt many to accept it as a true explanation of the problem. It is, however, too complicated to be fully described in this article. Briefly, Ehrlich considered that certain cells attacked by the products of invading bodies yielded, as the result of the stimulation, certain specific anti-bodies or receptors, often in such excessive numbers that on recovery these were constantly present and opposed to the re-invasion of the body by forces similar to those which originally brought them into existence. According to the theory, the more the cell was affected by a toxin the more actively the damaged cell would form receptors, to be cast off into the circulating blood. When an animal had thus added to its blood a sufficient number of receptors, these would serve to protect the sensitive cells by combining with the toxin before it could reach them. Thus, when inoculating with the serum of an immunised animal to produce passive immunity, receptors are conveyed to the animal inoculated, which would explain why passive immunity is of short duration, as the receptors are gradually destroyed or excreted. On the other hand, in active immunity the resistance lasts because the cells continue to produce and cast off receptors after their stimulation by the toxin has ceased. The theory accounts for the neutralising of toxins, but does not altogether explain the destruction of the parasites: susceptibility to infection by toxin and bacteria are by no means identical. For example, "A horse practically never contracts human diphtheria, nevertheless it is very sensitive to diphtheria toxin; hence his escape from infection must be ascribed to something else than non-sensitiveness to the toxin. Probably that something is a capacity of the horse's leucocytes (white blood-cells) to deal with diphtheria bacilli more successfully than human leucocytes can" (M'Fadyean).

The original theory of Metchnikoff was subsequently modified to fit in with many of the facts of the humoral theory,

the white blood-cells being regarded as the principal source of the anti-toxic substances. Other investigators have also drawn attention to the physical forces which also take part in the process of resistance. "The various phenomena of immunity cannot be ascribed either to the activity of the body cells or the body fluids alone, to the total exclusion of the other; both are intimately concerned in various phases of immunity" (Kolmer).

The different theories are too abstruse and too theoretical to discuss in detail. It is sufficient to emphasise here that the animal system responds in some remarkable way to the introduction into it of foreign elements, not only bacteria and their products, but to a great variety of organic materials. "For instance, a rabbit treated by subcutaneous injection with horse serum responds by producing a substance which is antagonistic to the horse serum, in the sense that it will produce a fine precipitate in it. The effect is specific because the serum so treated will not produce a precipitate in ox serum. The same peculiar specific effect can be obtained by treating a rabbit with the expressed muscle-juice of a horse. When one has got a rabbit so immunised, one may use its serum to ascertain whether a given piece of muscle-tissue is from a horse or other animal. The rabbit serum will cause a precipitate in the clear maceration from a piece of horse-muscle, but not in a similar preparation from beef, pork or mutton" (M'Fadyean). A practical application of this process has been found useful in the determination of the mysterious constituents of German sausages.

Similarly, by injecting red blood-cells from a horse into a rabbit, a specific material is produced (haemolysin) which is capable of dissolving the red cells of this or any other horse. When bacteria are inoculated, substances are produced which will kill bacteria (bacteriolysins) or possess the power of causing similar bacteria when suspended in a fluid to adhere or agglutinate in clumps (agglutinins).

The foregoing paragraphs, apparently important only in theory, have nevertheless many valuable practical applications, some of which will be enumerated in the next issue of this *Journal*.

(To be continued.)

Maize Planting with Fertiliser and the Advent of the Rains.

By A. G. Holborow, F.I.C., Assistant Agricultural Chemist.

In dealing with the subject of the fertilising of maize, it can be stated, with some degree of assurance, that good progress has been made in Rhodesia. By careful analyses, supported by trial work in the field, we know the requirements of our soils and how best to encourage these soils to produce the maximum yields of maize for the minimum expenditure on fertiliser dressing. Those who have intelligently followed the *modus operandi* in arriving at the correct mixture, and, which seems to be still more important, the amount to apply per acre, whereby the most profitable returns are assured, cannot but feel satisfied with the results. The object of this article is not to emphasise the profitableness of using artificial plant foods; that has been clearly demonstrated on previous pages in other numbers of this *Journal*.

It is desired to follow a little more closely, and to endeavour to offer an explanation for, the adverse effect of last season's weather conditions upon our fertilising experiments at the Government Farm, Gwebi. At the reaping season, profits were looked for in vain on those plots that had received manurial treatment. In every instance it was noticed that although small increases in the yield due to the fertiliser were observable, yet the values of these increases were only just sufficient to pay for the fertiliser dressings. The applications of artificial manure which have in previous years produced profits for the first year of application, of 56s. 6d. and 49s. per acre, failed last season for the first time in our Rhodesian experience to shew the profits anticipated. In all instances the

conditions of the experiments last season were similar to those of previous years. One factor, however, must be excepted. This particular irregularity was the weather. It would be well to tabulate here the rainfall at the Government Farm for the months of November, December and January for the two past seasons, *i.e.*, 1914-15 and 1915-16.

TABLE OF RAINFALL AT GOVERNMENT FARM, GWEBI.

	1914-15. Inches.	1915-16. Inches.
November	2.14	1.62
December	11.39	2.26
January	7.09	12.04

The object of the above table is to shew clearly the advent of reliable rains after the sowing of the seed maize. Sowing took place each year on 8th December, and with it (or just previously in the case of broadcasting) the dressing of artificial fertiliser. It will be observed that in the year 1914, the good season, the amount of rain that fell in December was 11.39 inches. Reviewing the month of December in the following year, the bad season, only 2.26 inches fell. It was not until January was completed that as much as 12.05 inches of rain were registered for that month.

Let the conditions in which the young maize grew in these two seasons be compared. As before stated, the treatment of the soil, cultivation, etc., were similar on both occasions, and moreover the soils were practically identical, both experiments being conducted on the same farm, on closely adjacent red soil plots. The seed maize germinated, and within a short time the plant revealed itself above ground. Simultaneously the delicate roots pushed their way through the soil in search of plant food. These plant foods, *i.e.*, nitrogen, potash and phosphates, were contained by the fertiliser. The fertiliser particles, of varying sizes of course, became mixed with soil particles in the earth. Later, the rain came in adequate quantity and dissolved the fertiliser particles, because they are soluble in water. It evenly and regularly distributed the plant food (now dissolved in water) in every interstice between the soil particles, making a homogeneous mixture of earth and

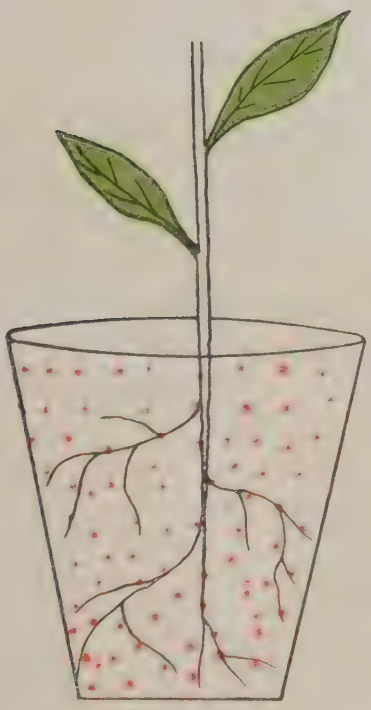
dissolved plant foods. Follow what happened when the roots in search of food made their way through the soil. Practically speaking, every point on the root came in contact with water containing dissolved fertiliser. Every root hair and every part of a root hair acquired its food. The plant, therefore, was satisfactorily nourished during the critical time of its life. Its constitution was established, its growth was quick and sure, and later the healthy plant was able to combat possible adverse climatic conditions.

It was quite a different matter with the fertilised soil that had not received its rain during the *early* growth of the young maize plant. Imagine a rootlet in its entire length having only a comparatively few particles of fertiliser in direct contact with it, from which to glean its sustenance. Reasoning *a posteriori*, this appears to the writer to have been the case. There was practically no rain, and the fertiliser particles remained in the soil in the undissolved condition just where they were originally placed. This means that the soil was not thoroughly impregnated with plant food as in the former case, and it is reasonably supposed that only a comparatively few points on a root absorbed food for the plant, because the particles of fertiliser were relatively very wide apart. Although roots are known to supply juices to dissolve plant foods, the application of the solvent must be strictly local, and only nourishment can be obtained from that particle of fertiliser which is approximately touching the root. The inference is that the maize plant received only a portion of its nutriment.

The accompanying diagram has been drawn, illustrating the dry fertilised soil and the wet fertilised soil with the root.

Up to this point the writer has endeavoured to shew how the maize plant is assisted in obtaining its food by the medium of rain or water, and on the other hand how the plant suffers through insufficient supply of it. Let us look at our fertilising returns in the following tables, and see what actually happened in the two seasons.

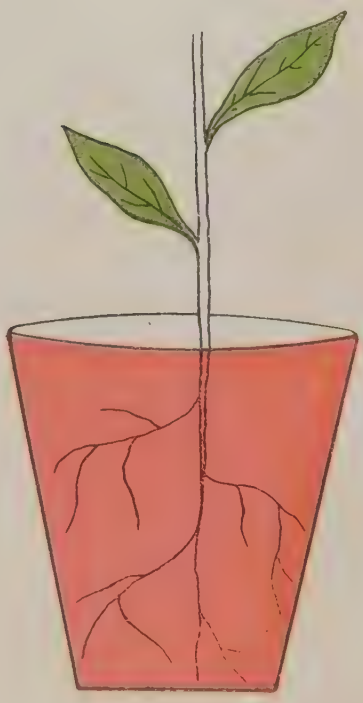
DRY FERTILISED SOIL



Red = fertiliser particles.

Note proportionately large surface of root unable to get fertiliser.

WET FERTILISED SOIL



Red = fertiliser after being distributed throughout the soil by rain.

Note that all the surface of the roots can obtain fertiliser.

TABLE I.

Effect of rains early after planting on fertilised maize.

SEASON 1914-15.

	Manurial dressing per acre.	Yield per acre. lbs.	Cost of fertiliser dressing.	Value of increase due to manuring, less cost of fertiliser dressing.
	No manure	2,061	...	...
Plot 1	12 lbs. Sulphate of ammonia 20 lbs. Blood meal 65 lbs. Double superphosphate 20 lbs. Sulphate of potash	3,475	18/11	P. £2 16 6
Plot 2	35 lbs. Nitrate of soda 65 lbs. Double superphosphate 25 lbs. Sulphate of potash	3,293	20/-	P. £2 9 3
Plot 3	12 lbs. Nitrate of soda 15 lbs. Blood meal 20 lbs. Basic slag 17 lbs. Sulphate of potash	3,186	19/11	P. £2 5 0

P. = profit per acre.

TABLE II.

Effect of rains late after planting on fertilised maize.

SEASON 1915-16.

	Manurial dressing per acre.	Yield per acre. lbs.	Cost of fertiliser dressing.	Value of increase due to manuring, less cost of fertiliser dressing.
	No manure	1,467	...	...
Plot 1	12 lbs. Sulphate of ammonia 20 lbs. Blood meal 65 lbs. Double superphosphate 20 lbs. Sulphate of potash	2,243	18/11	P. 12/1
Plot 2	35 lbs. Nitrate of soda 65 lbs. Double superphosphate 25 lbs. Sulphate of potash	2,026	20/-	P. 2/-
Plot 3	12 lbs. Nitrate of soda 15 lbs. Blood meal 140 lbs. Basic slag 17 lbs. Sulphate of potash	2,032	19/11	P. 2/7

P. = profit per acre.

Observe that the fertiliser dressings were identical for both years, except that only 20 lbs. basic slag in Table I., Plot 3, was inadvertently incorporated in the mixture in place of 140 lbs.

Viewing the small profits for the season 1915-16, and comparing them with the successful profits of the previous

year, it cannot be said that artificial manures were profitably applied to maize last season. The above are not the only plots that suffered at Gwebi on account of the adverse seasonal conditions. All the experimental plots were similarly affected, and could be quoted if space permitted.

There is another phase of the situation which it is well to consider. It is involved in the effect of the bad rainy season, *i.e.*, when rain was long delayed after planting, upon the value of the first year *residual* fertiliser. It is customary to look for considerably increased yields the first season after the application of the manurial dressing. It will be wondered if the lack of rains in December last would prove as disastrous to the *residually* fertilised crop as it did to the completely fertilised crop of the same season. The figures of the following table will corroborate the statement that *residually* fertilised maize crops were not affected adversely by the drought. The reason for this is apparent. The previous year, *i.e.*, the season when the manure was applied, the rains thoroughly incorporated the plant foods with the soil, consequently rendering them easily accessible to the plant roots. During the following dry season they absorbed their easily obtained food by virtue of their own exuded juices. That is the function of these juices.

TABLE III.

Yield of maize on *residually* fertilised plots.

BAD RAINY SEASON 1915-16.

Manurial dressing. See Table I.	Increase due to *residual* fertiliser. Season 1915-16.	For comparison. Increase due to full manurial dressing of fertiliser. Season 1915-16.
	lbs.	lbs.
Plot 1	925	776
Plot 2	806	559
Plot 3	762	565

This means that the *residual* fertiliser, disregarding the bad rainy season 1915-16, produced greater increased yields

of maize than that of the full dressing of the same fertiliser in the same season. It may be asked, for information and comparison, what would be an average increase in the yield due to *residual* fertiliser? We have record of a dressing similar to Plot 2, and the increase due to the first year *residual* fertiliser in the year 1913 amounted to 502 lbs.

It is not an easy matter to forecast the advent of reliable rains, but it appears from our experiences at the experimental farm that it is positively essential that maize should be sown immediately, or at the earliest possible time, before the permanent rains set in, in order to ensure success. Whether it will ever be possible, with the aid of information from meteorological stations, to get a moderately accurate idea when the rains will become general in Rhodesia is not in the writer's province. At present, maize growers are strongly advised to be yet more careful, to make a special study of the meteorological conditions of their districts, so that all possible unnecessary risks in the time of planting will be minimised. This may appeal more to those who have expended money in fertiliser, but it surely applies to all?

Reports on Crop Experiments at the Government Farm, Gwebi,

SEASON 1915-16.

By Eric A. Nobbs, Ph.D., B.Sc., Director of Agriculture.

PART II.

Rotation Plots.—Some of the most important experiments of the season were those connected with the problem of rotations, the intention of which is to find out suitable sequences of crops to grow with maize as the main or most frequent crop. The rotations extend over four and in some cases six seasons, and as only the first year has passed, it is, of course, not possible to give any conclusions, nor will this be possible for several years to come. But some particulars of the crops may prove of interest, as they are grown on purely commercial lines, and a careful note kept of all operations and costs. The plots are three acres each, and they are arranged in long narrow strips, which experience has shewn to be somewhat poorer at the one end than the other, but in this respect all are alike. The soil is best described as the ordinary red soil of the country, yielding in a fair season, without manure, 8 to 9 bags of maize per acre, as shewn by a large number of separate determinations. The comparison of yields of different plots is, however, not of consequence in this experiment, except those adjacent belonging to the same series, as the comparisons are only made against these or against different crops in the same plot in successive seasons.

It would be premature to detail the rotation arrangements, as these are necessarily only tentative until conclusive deductions can be drawn from the returns of several years.

It may be enough to explain that the series of plots comprises maize continuously, maize three years out of four, two years out of three, in alternate years, one year out of three, and one year out of four, and, to complete the series, a rotation with no maize is included.

Besides these crops grown in the rotation experiments, a number of others are detailed here, with a view to indicating what may be expected from them under ordinary circumstances. If some farmers are already familiar with them, there are yet many who are anxious to add to the number and variety of their crops, and to such these particulars may be of use.

Allowances must be made for the unfavourable season last year. It must also be borne in mind that the soil is by no means exceptionally fertile, and that, as many plots are purposely not fertilised, farmers need not regard the results as at all beyond their powers to attain or surpass. Many crops are met with in the country heavier than those here described.

Maize.—Salisbury White maize, selected for many years, was employed in the rotation trials. The maize was all treated alike, the land ploughed once, rolled and disced, 100 lbs. of Rhodesian maize (Safco) fertiliser broadcasted per acre, the seed sown in drills 40 inches wide and 15 inches apart, at the rate of 12 lbs. per acre, at the end of November and early in December, harrowed with the Eureka weeder a fortnight later, twice horse-hoed and once hand-hoed, the land being clean and the season not necessitating more cultivation. The stalks were cut and stooked in May, the cobs being removed and husked later, and the shelling completed in August. The late advent of the rain and the long drought in February adversely affected the yield. The cost of all operations averaged £1 2s. 1d. per acre, and the fertiliser cost 12s. 6d. per acre in addition; total £1 14s. 7d. The cost per bag depended on the returns, which varied from 8.05 to 11.6 bags, and averaged 9.62 bags per acre, costing from 2s. 11d. to 4s. 3d., and averaging 3s. 6d. per bag on the farm, without charging for land, supervision, interest, sacks or transport.

This cost of production per acre is made up as follows:—

	s.	d.
Preparatory cultivation	3	9
100 lbs. Safco R. M. fertiliser	12	3
Application	1	0
Seed (12 lbs.)	0	7
Sowing	0	9
Cultivations	6	0
Reaping	7	6
Shelling and bagging	2	6
	£1	14 4

Every plot on the experiment farm is separately harvested and threshed or shelled, or otherwise prepared for market or use on the farm according to its kind, and its weight recorded. The charge for reaping the maize is higher than might be expected, but includes cutting the stalks and stooking them for fodder purposes; also selection of cobs for seed for sale. The results of the nine rotation plots under maize in this series were as follows:—

Acre-Yield of Maize in lbs.	Acre-Yield of Maize in Bags.	Approximate Cost per Bag on the Farm.	Previous Crop.
		s. d.	
2,320	11·60	2 11	Mangolds
2,180	10·90	3 1	Summer wheat
2,070	10·35	3 3	Majordas
1,990	9·95	3 5	Summer wheat
1,985	9·92	3 5	Part maize; part new land
1,756	8·78	3 10	Maize
1,670	8·35	4 1	Maize
1,740	8·70	3 11	Maize
1,610	8·05	4 3	Maize
1,924†	9·62†	3 6†	

† Average for 27 acres.

It is instructive to observe that all the lowest yields were obtained from land cropped the previous year also to maize; the best was naturally that after mangolds, which had received 8 tons of dung and artificial fertilisers as well.

A side light with regard to the influence of a previous crop in a rotation on maize may be gathered from the following yields of Salisbury White maize unmanured but following the crop indicated:—

Maize after maize (7 acres) gave 1,520 lbs. per acre.

Maize after ground nuts (4 acres) gave 2,112½ lbs. per acre.

Maize after buckwheat (1 acre) gave 1,320 lbs. per acre.

Maize on new land (27 acres) gave 780 lbs. per acre.

Repetition of such observations must be frequent before general conclusions can be drawn, but the benefit from the ground nuts seems apparent.

Oats.—The history of three plots of Kherson sixty-day oats, summer grown, is instructive, shewing as it does that this crop can be successfully and profitably grown without irrigation. The land had been ploughed, rolled and disced in winter, and only required one stroke of the drag harrow to prepare it for the seed. The seed, which had been grown on the farm the previous season, was drilled at the rate of 28 lbs. per acre, in rows 8 inches apart, along with 100 lbs. per acre of Safco double complete fertiliser. Subsequently the land was rolled and some weeds hoed out during March.

Sown on the 21st of December, by the 5th of February the oats stood 12 to 15 inches high and looked very well. It then suffered a check from want of rain, and was in full ear a month later. A nice crop of oat hay could have been secured, but although this might have been more immediately profitable, the crop was intentionally allowed to ripen in order to have seed for distribution to farmers for next season. The crop was cut on 6th April with a self-delivery reaper, sheaves tied by hand, and afterwards the seed threshed out with a hand power thresher and winnowed. The cost per acre works out as follows:—

	s.	d.
Preparatory cultivation	4	6
100 lbs. Safco Double Complete Fertiliser	27	6
Application of fertiliser	1	0
Seed at 20s. per 100 lbs.	5	8
Sowing	0	10
Cultivations	3	9
Reaping	10	0
Threshing, winnowing and bagging ...	5	0
	£2	18	3

The grain is naturally small, but of good quality; only a few plants were attacked by rust whilst ripening, which proved the presence of that dread disease and the power of this variety to resist it.

Yield of Oats per Acre.		Previous Crop.
Grain.	Straw.	
570 lbs.	880 lbs.	Part maize; part new land
540 „	880 „	Summer wheat
455 „	880 „	Maize
522 lbs.†	880 lbs.†	

This oat is well suited for hay, but taking the grain at the current price of 20s. per 100 lbs., and the oat straw at £2 per ton, the average value was £6 1s. 6d. per acre, and the cost of producing on the farm £2 18s. 3d.

Another experiment was made with oats of three different varieties, in order to test their relative merits on moist, clayey land which cannot be worked during the summer. The treatment accorded was the same as above, but no fertiliser

† Average for 9 acres.

was used, and 25 lbs. of seed were sown per acre. The seed was sown on the 16th February, but owing to the dry weather at this period, much did not come up until the first good rains three weeks later, and, on this account, the stand was throughout very uneven, and the crops all round lighter than usual. On the 1st of August the Burt and Kherson crops were cut for hay. The first yielded 1,050 lbs. per acre over three acres, and the second 1,160 lbs. per acre over two-and-a-half acres. The third variety, Smyrna, was allowed to ripen for seed and eventually yielded 1,060 lbs. of grain and straw per acre. This oat is evidently the best for winter sowing on moist or irrigated land. The other two do well as summer crops.

Velvet Beans.—For the nine acres under this crop, the land had been ploughed and drag harrowed once, no manure was given, but one plot followed mangels, which had been dunged. The seed was that grown on the farm the previous year, and was planted on 11th December, in drills 30 inches wide and 15 inches apart, using 35 lbs. of seed per acre, harrowed once, horse-hoed twice, and hand-hoed finally in the middle of February. The stand was rather thin at first, but early in March the runners and foliage had quite hidden the ground between the rows. Flowering began in the second week of March, and thereafter the crop seemed to grow more luxuriantly.

The system of harvesting previously described was followed, namely, to cut the hay crop early, and leave the bunch of pods round the base of the plant to ripen for seed. By this means both seed and hay are secured, the latter being in the best possible condition. Greater weights of either grain or fodder could doubtless be obtained if the crop were grown for one or the other alone, but the advantages of the system here recommended are several. By it the difficulties connected with gathering the pods after the plants have been killed by frost are overcome, and the trouble experienced in handling a crop which stings and irritates the skin of the harvesters is much reduced. The hay was made early in April; the beans gathered in the second week of June, and threshed out only when thoroughly dry in September.

The cost per acre is recorded as follows:—

	s.	d.
Preparatory cultivation	3	9
Seed, 35 lbs. at 2d. per lb.	5	10
Sowing	0	6
Cultivations	4	9
Hay making, sorting and baling	16	8
Reaping beans and carting to threshing floor	4	6
Threshing, winnowing and bagging ...	9	0
	£2	5	0

The cost of harvesting is relatively high, as it is done with hand labour, not with a mower. The value of the crop may be taken at 25s. per 100 lbs. for the beans and £4 per ton for the hay; total, £5 4s.

Cow Peas.—Owing to the injury caused by the bean stem maggot (*Agromyza fabalis*) and the frequency of nodular growths on the roots due to root gall worms (*Heterodera radicicola*), which materially diminish this crop and render it uncertain, it is not favourably regarded at the Gwebi farm, where velvet beans have been found in every way superior.

However, a three acre plot sown on 16th December did well, forming a dense mass of foliage, which, after the ripe beans had been gathered during the first half of May, was ploughed in as a green manure for the next crop. The grain when threshed out yielded 310 lbs. per acre.

In another experiment lighter returns were obtained and more injury suffered, but it was observed that the Natal Black variety was distinctly superior to New Era.

Cow peas were also tried mixed with maize for ensilage, and did fairly well.

Mangold Wurzel.—This crop has once more, even in an unfavourable season, fully justified its inclusion amongst our regular sources of food supply for stock. Of much higher nutrient value than pumpkins or majordas, it has the same advantages of succulence and keeping qualities, and, left in the ground till wanted, it forms an invaluable stock feed

during August, September and October for milch cows, fattening cattle or sheep.

The land was well treated in anticipation with 7 tons of kraal manure per acre and 100 lbs. of double complete Safco fertiliser in the drills. Imported seed was sown on the 7th January, using 8 lbs. per acre. It was thinned shortly after germination, cultivated twice, and ridged up with a wing shovel plough in the middle of March and again in the middle of April. The crop was ready for use any time from 1st June onwards, being lifted as required for the stock.

Variety.	Yield in Pounds per Acre.	
	1914-15.	1915-16.
Yellow Globe Prize-winner	17,900	14,340
Sutton's Half Sugar	25,750	15,870

Including manure, the field costs were £4 3s. per acre, and the returns, though less than last year, were well worth the expenditure.

Majordas.—A three acre plot of majordas was grown in one of the rotation experiments on ground prepared as in other cases, and dressed with 6 tons of kraal manure per acre, applied round the seed hills, which were placed 12 feet apart. The seed was that grown on the farm the previous year, and was sown on the 18th November. Complete re-sowing was necessary on 26th December, owing to the depredations of beetles and lady birds. In the middle of January the plot was still very backward, the insects active and the prospects of a good return were poor, but later it recovered wonderfully, and by April was looking very well indeed. A Martin cultivator was used six weeks after planting, and later the land was twice hand-hoed. The crop, which ripened from the middle to the end of May, yielded 30,500 lbs., or 15¼ tons of majorda melons per acre, which were used throughout the winter as a succulent feed for the stock. The cost of opera-

A good crop of Majorda Melons at Premier Estate, Umtali.

tions may be taken at £1 18s. per acre, so that the return is a very profitable one.

Sweet Potatoes.—This is a crop to which far too little attention is devoted in this country as yet. Generally grown on a garden scale, it is found everywhere, but it is hardly sufficiently realised that on our ordinary red soil it can be profitably cultivated as an ordinary field crop. Last season sweet potatoes were tried on one of the rotation plots and did well, although, had it been possible to plant earlier, and lift later, giving it a longer growing season, no doubt a heavier yield would have resulted, as many of the tubers were small and immature. For human consumption, especially on the mines, and for cattle and pig food, sweet potatoes are excellent, and the tops form a valuable food for cows in milk.

The land was dunged, and a dressing of 100 lbs. Safco double complete fertiliser applied as well. Slips were planted 36 inches by 18 inches apart, cultivated once, ridged up once and hand-hoed once. The tops were cut down by early frost in the end of May. The field costs, including dung, were £3 6s. 6d., and the return came out at 9,450 lbs. per acre.

Potatoes.—Many growers of potatoes experience a difficulty in keeping their seed tubers. An attempt was made at the Gwebi farm to overcome this difficulty by early planting, with satisfactory results. One acre of typical red soil, after five successive crops of maize, was ploughed, rolled and disced during winter. The ground was opened with a ridging plough, and eight tons of manure spread in the furrows. The seed, at the rate of 1,200 lbs. per acre, preserved from the previous season's crop, was planted early in October on top of the manure and covered by hand. The crop was cultivated once, hand-hoed once and twice ridged up, and was ripe at the end of February, but not lifted until 19th April, as being the easiest way of preserving the crop till wanted for market. The cost works out at £1 16s. 9d. per acre, and the return was 4,200 lbs. table potatoes, 2,450 lbs. of seed, and 1,200 lbs. chats suitable for pig feed; total, 7,850 lbs. per acre.

Teff Grass.—This annual grass is being more and more largely grown for the excellent hay it yields, and the useful

purpose its thick, rapid growth serves in killing weeds and cleaning land. Although now quite general, carefully collected figures as to returns and costs are not readily available, and the following, relating to 10 acres, are therefore of interest. Land which had been ploughed, rolled and disced was drag-harrowed to create a fine seed bed; 10 lbs. per acre of teff seed were sown broadcast by hand. The crop suffered a set-back through the drought, which certainly affected the yields; the total rainfall was 4.36 inches prior to sowing and 17.9 inches thereafter; 22.26 inches in all. Part was cut twice for hay, on the 6th March and 4th April, and the remainder was cut ripe for seed on the 23rd March. Thereafter the stubble yielded excellent grazing for the Merino flock.

The two cuttings for hay yielded a total of 1,680 lbs. per acre, the other 390 lbs. of seed per acre.

The following is a statement of the cost of operations :—

	s.	d.
Preparatory cultivation	3	9
Seed (farm grown) and sowing (broadcasted by hand)	2	0
Cultivations	0	9
Reaping	10	0
Baling and threshing seed	10	0
	£1	6	6

Boer Manna.—This old favourite proved a profitable crop on seven acres of land reckoned as some of the less fertile on the farm. It came through the vicissitudes of an unfavourable season in a remarkable manner. Sown broadcast at the end of November, on very well prepared land, at the rate of 14 lbs. per acre, the crop suffered at two stages from want of rain, but for which it would have been even better than it was. A portion was cut when in the best state for hay, and this yielded at the rate of 3,680 lbs. per acre, which, at 50s. per ton, is a return of £4 12s. for an outlay of £1 5s. 3d. The bulk of the plot was kept for seed, and, when harvested and threshed out, yielded 408 lbs. of seed and 2,000 lbs. of straw per acre, which, at 4d. per lb. for the grain and 10s. for the straw, is £7 6s. per acre.

Residual Value of Artificial Fertilisers.—Whilst this subject has been dealt with elsewhere, the results of certain separate and distinct experiments, intended to ascertain to what extent artificial fertilisers influenced the crop of maize in the second year, are given here.

The plot in question consisted of 15 acres of Salisbury White maize divided into three plots, of which one had received in the previous season 100 lbs. of Rhodesian maize fertiliser per acre, another 100 lbs. of double complete Safco fertiliser, and the third had remained unmanured. The total rainfall for the season was only 22.42 inches, but the maize throughout did well, even that receiving no fertiliser. The ground was ploughed, rolled and disc-harrowed. The young crop was harrowed with the Eureka weeder, cultivated twice and hand-hoed once. The cost of all operations, including shelling and bagging, worked out at £1 1s. 3d. The value of the crop from the unmanured plot, at 8s. per bag, is £3 11s., and from the manured plots there is an additional return. The results may best be tabulated as follows :—

Plot.	1914-15.	1915-16.	Totals for two Seasons.
	Per Acre.	Per Acre.	Per Acre.
Rhodesian maize fertiliser	3,562 lbs.	2,108 lbs.	5,670 lbs.
Safco double complete fertiliser	3,290 „	1,974 „	5,264 „
Unmanured	2,450 „	1,772 „	4,222 „

From these figures it will be seen that the Rhodesian Maize Fertiliser in both years gave considerably the best results, and for the two seasons was two bags ahead of the Safco Fertiliser and over seven bags ahead of the unfertilised experiment. As the cost was 12s. 3d. per 100 lbs. for the Rhodesian Maize Fertiliser, and 20s. per 100 lbs. for the Safco Double Complete Fertiliser, it will be seen how profitable has been this application. It should be noted in this connection that the composition of the fertilisers named above differs this year from what it was in 1915, and that these results must not be taken as applicable to these com-

modities as now offered for sale. In view of the comparatively large size of these plots, confidence may be placed in the results.

Experiments with Nitrolim.—A fertiliser new to Rhodesia was kindly placed at the disposal of the Department by the Anglo-African Trading Co. by the name of "Nitrolim," an artificial combination of lime and nitrogen, which is as yet new to farming practice. As only a small quantity was available, it was applied in conjunction with 100 lbs. of Rhodesian Maize Fertiliser to a series of one acre plots sown to 10-row Hickory King maize. Owing no doubt to the drought, the yields throughout were light, and the control plot, which received the Rhodesian Maize Fertiliser without Nitrolim, gave a return of only 1,100 lbs. per acre; that which received in addition 50 lbs. of Nitrolim at seeding, gave 1,250 lbs., but where a similar application was put on as a top dressing, only 1,050 lbs. resulted. Where lesser applications of Nitrolim were used, no difference sufficiently large to be attributable to the fertiliser could be seen. These results cannot be regarded as very satisfactory or conclusive, but as no Nitrolim is procurable this season, the matter is not one of immediate moment, but it is hoped to give further trial to this preparation in future years, when the article is commercially procurable.

Ploughings for Maize.—The respective merits of the disc plough and the mould-board plough are much disputed, and no doubt the decision must be arrived at by every farmer individually for his own farm, and indeed for the different types of soil he will find on his farm. Shewing how simply this may be done, the account of the following experiments may be read with interest :—A uniform piece of land which had been under Salisbury White maize for the year 1914-15 was again sown with the same crop last year. Except as regards ploughing, all was treated alike and given 100 lbs. of Rhodesian Maize Fertiliser. All three plots were sown on one day and harvested on one day. On one plot the disc plough was used, on the other the mould-board plough, and of these one was sub-soiled as well. A month after sowing, the disc-ploughed plot was obviously better than either of the others, the ground which had been ploughed by the mould-

board plough being much rougher, so much so that germination had been affected. A month later, the disc-ploughed plot still looked the best, and stood about 5 ft. high, the other plots only ranging from 2 ft. to 4 ft. These differences, however, were not obvious to the eye when inspection was made in the beginning of February. The cost per acre where the disc plough was used amounted to £1 14s. 7d., where the mould-board plough was employed it was 6d. more, and where the land was sub-soiled in addition, there was an increase in cost of 2s. 6d. or 3s. more than the first plot. The yields were as follows :—

Plot mould-board ploughed and sub-soiled, yield 2,215 lbs. per acre.

Plot disc-ploughed only, yield 2,134 lbs. per acre.

Plot mould-board ploughed only, yield 2,060 lbs. per acre.

Thus disc-ploughing appeared to give a slight advantage over the mould-board ploughing, but the benefit of sub-soiling more than counter-balanced this, although in no case are the differences very great. It is, of course, impracticable to sub-soil when employing the ordinary 3 or 4 disc plough.

Failures.—In addition to the reports here published, there was a certain number of experiments—happily not very many—which for one reason or another proved failures, in the sense that the results were not conclusive, and helpful only as guiding the experimenter as to lines of enquiry to be further followed up. Thus, some 12 acres of teff on poorer soil were sown so late as to be ruined by the February drought. Certain varieties of wheat extending over 5 acres took rust and failed, and certain pasture plants also proved failures.

Sundry experiments in the treatment and manuring of dhal were tried, but owing to the weather throughout the season not favouring rapid growth, and a severe early frost on the 6th June, the plants were all cut down before the pods matured, and no comparative results are available in consequence. The crop is not to be condemned, however, on account of these failures, for elsewhere in the vicinity, where it escaped this disastrous frost, dhal has done well.

These cases are mentioned, as they explain in part the financial loss at which our experiment station must of necessity be conducted. Other grounds for the unavoidable expense of such experiments are found in the fact that the results of every plot have to be separately harvested, baled, threshed or otherwise prepared, weighed and recorded; that each crop is divided into many small plots, and cannot be worked as economically as if in large compact blocks: that a score of crops are grown where the average farmer is content with half-a-dozen, of which maize as a rule vastly predominates. These facts the practical farmer will readily recognise. Against these charges, and the real return for the time and money expended on such experimental research, must be placed the information gained, the facts elucidated, the possibilities of our soil to which the attention of our farmers is called, and the errors from which they are saved. The returns from the outlay are not to be looked for on the Gwebi experiment farm, but on cultivated farms all over Rhodesia.

In closing this report of a season's experimental work, the writer wishes to place on record his appreciation of the work of Mr. J. H. Hampton, manager of the Gwebi farm. In so far as the experiments have been successful and of value to the country, the results are largely due to the unremitting care and conscientious supervision of Mr. Hampton, without which the expenditure of labour and money involved would have been in vain. Experiments of this kind entail a great deal of inconspicuous work carrying no obvious results. This may not be recognised by the public, but those responsible for the conduct of experiments know what it means. Mr. Hampton also assisted in the revision of the reports for publication.

Ground Nuts and other Oil Seeds.

RECENT INFORMATION.

OIL FACTORY ANNOUNCEMENT.

We have several times lately been asked to publish information respecting European prices for Rhodesian products. We have no cable service at our disposal, and it is doubtful if any useful object would be attained by the publication in a journal issuing only once in two months of information which must of necessity be several weeks old when it appears. On this point we should welcome a fuller expression of opinion from our readers, in whose interests the *Agricultural Journal* is carried on.

Meanwhile, we are glad to be able to give below certain information which has reached us from different sources in regard to the European markets for oil seeds.

TRIAL EXPORT SHIPMENT.

The British South Africa Company, in its Oil Factory Circular No. 3 of 28th January, 1916, stated that experimental shipments of oil seeds were being made to England, and that the results would be published for the information of the farming community as soon as ascertained. The results of an experimental shipment of oil seeds per S.S. "Gaika" on 27th February, 1916, are now to hand, and the Acting Commercial Representative has kindly furnished us with a statement which shews a loss on balance of £71. In his covering letter he remarks: - "The London produce market, being to a great extent abnormal, does not afford a reliable guide to the prices merchants may expect to obtain under ordinary trade conditions. It is obviously useless to consider the question of exporting ground nuts so long as the cost price to the factory amounts to 7s. 2d. per bag;" and he further says that he had recently received a cable advice to the effect that the price of sunflower seed had then (25th August) dropped to £17 per ton c.i.f., London.

STATEMENT SHEWING COST, CHARGES, ETC., IN CONNECTION WITH AN EXPERIMENTAL SHIPMENT OF OIL SEEDS TO ENGLAND PER S.S. "GAIKA," *ex* BEIRA, 27TH FEBRUARY, 1916.

Description.	Quantity, long tons.	Prime cost.	Railage, freight, shipping and other charges, less primage.	Total cost.	Amount realised.	Profit.	Loss.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Shelled Ground Nuts -	10 tons	143 6 8	119 18 11	263 5 7	136 1 6	...	127 4 1
Unshelled Ground Nuts	5 ,,	50 3 4	70 0 3	120 3 7	99 11 9	...	20 11 10
Sunflower Seed - -	7½ ,,	52 10 0	77 4 1	129 14 1	216 12 1	86 18 0	...
Castor Beans - -	3¼ ,,	30 6 8	29 18 6	60 5 2	50 3 1	...	10 2 1
						86 18 0	157 18 0
					Net loss -	71 0 0	...
						£157 18 0	£157 18 0

LONDON PRICES.

The Farmers' Co-operative Society, Salisbury, has also been in communication with London agents on the same subject, and the manager has very courteously placed the following report at our disposal:—

"*Ground Nuts.*—Large quantities can always be sold to either Marseilles (in peace) or to England. Like all feeding and grinding markets, they are quiet at the moment, and to-day's (August) value, London or Liverpool, is about £17 per ton c.i.f. Early in the war prices rose to £22 per ton, but have since steadily declined. The value to Marseilles, if the nuts can be shipped there, is a little over London prices. In normal times, prior to the war, values varied between £14 to £16 per ton c.i.f., and no doubt that will again be about the basis.

"*Sunflower Seed.*—The market is a very small one, and large quantities have been offering lately. The price at the beginning of July was as high as £28 per ton, then, owing to over-supplies, it fell back to £22 per ton. Directly the supply is too great for poultry food, prices come down to a crushing level, which is little over £15 per ton, continental markets being non-existent. With regard to the sample of sunflower seed which you sent us, it is very fine quality, and we do not think a bulk could be shipped like it. On the sample sent we reckon a premium of £5 per ton could be commanded. Your f.a.q. runs about on the same basis as Russian and Japanese seed, but your sample puts anything else in the back-ground." (The sample of sunflower seed which is so highly commended came from Mr. Morkel's farm Ceres, Shamva.)

LUBRICATING OILS.

The Agricultural Department has recently been corresponding with the Imperial Institute on the question of the suitability of ground nut oil for lubricating purposes. Dr. Dunstan, Director of the Institute, who is unsparing in the trouble he takes to assist us in all such matters, sends the following report, which we publish for general information:—

"Ground nut oil is a non-drying oil, and therefore belongs to the class of vegetable oils which can be used as lubricants. At the present time, however, it is not usual to employ vege-

table oils alone as lubricants except for special purposes, such as the lubrication of clocks, watches and other delicate mechanisms, or for certain parts of textile machinery. For ordinary machinery, mineral oils, either alone or mixed with a non-drying vegetable oil, are now almost universally employed. In general, pure mineral oils of relatively low viscosity are used for high speeds and low pressures, and mixed mineral and vegetable oils of higher viscosity for low speeds and high pressures. Mixed oils containing from 20 to 30 per cent. of vegetable oil are stated to be the best lubricants for ordinary loads and speeds.

"Vegetable non-drying oils are also used in the manufacture of certain types of lubricating 'greases,' which consist of a mineral oil mixed with the soda or lime soap (generally the latter) of the fatty oil. Soaps made from ground nut oil are stated to be quite suitable for this purpose.

"Ground nut oil alone could not be recommended as a general lubricant for railway, mining and agricultural machinery, and it would probably not be feasible at present to start the preparation of mixed lubricating oils and greases in Rhodesia. If, however, these products are being manufactured in South Africa, it might be possible to dispose of the ground nut oil to the makers. For use as a lubricant, ground nut oil would require to be treated or refined in order to remove any free fatty acid."

OIL FACTORY PURCHASES FOR THE COMING SEASON.

At the last Agricultural Union Congress, the Acting Commercial Representative was requested to announce in the October number of the *Agricultural Journal* what quantity of ground nuts the Company would be prepared to purchase out of the crop grown in the 1916-17 season, and what prices would be paid for same.

The capacity of the Oil Factory is limited, and the Company cannot undertake to purchase all the crop that might be grown, but it is hoped that the publication of a definite statement at an early date will at least serve as a guide to the farmers as to the quantity of this crop they will be safe in planting this season, not overlooking, of course, the fact that there are local markets outside the factory.

The Company is of the opinion that the fairest method is to make known the maximum quantity that it can receive, and then invite the farmers to send in offers at once, quoting the quantities they are prepared to grow this year and sell to the factory.

The Company's offer to buy is double what it was last year, namely, 14,000 bags instead of 7,000. Tenders must be sent in on or before 20th October, and they will be dealt with on the *pro rata* basis up to the maximum of 14,000 bags. The farmer who tenders, as soon as he receives a reply from the factory saying how much of his tender is accepted, will be in a position to decide how many nuts he shall plant, and will know exactly how much he will be sure of selling at a fixed price.

It is hoped that the date given for receiving offers will give sufficient time to enable farmers to complete their planting after receipt of replies from the factory.

A circular has been issued to farmers' associations to the effect that the factory is prepared to purchase 14,000 bags of ground nuts, unshelled, of 80 lbs. each net; that the nuts will be graded at the factory by the Company, which also reserves the right to reject consignments of poor quality; that the first grade will be paid for at the rate of 7s. 2d. per bag, and second grade at 6s. 6d. per bag. The particular variety of nuts offered should be stated.

Attention may be drawn to a recent advertisement in the daily press by the Railway Company announcing a reduced scale of rates on oil seeds for export *via* Beira.

LOCAL PRICES.

The following prices for oil seeds were ruling in South Africa at the places and on the dates given:—

Sunflower seed, Johannesburg, 8th September, 8s. 9d. to 9s. 6d. 100 lbs.

Ground nuts, Pretoria, 9th September, 11s. 9d. to 12s. 6d. bag.

Ground nuts, Bloemfontein, 8th September, 10s. to 16s. bag.

Ground nuts, Salisbury, 20th September, 9s. bag.

Shedding for Milch Cows on Rhodesian Farms.

By R. C. Simmons.

Regular readers of the *Journal* will perhaps remember an article by the present writer in the February, 1913, number entitled "Notes on the Building of Farm Homesteads," in which the open, or lean-to, style of shedding for cattle was recommended, and the general arrangement of shedding in the form of three sides of a hollow square was advised. Since 1913 the plan thus advocated has been adopted, with slight variations, by several farmers in the country, and has in each case given satisfaction. At the present moment increased attention is being given to the potentialities of Rhodesia as a dairying country, and it may be said without fear of contradiction that the necessity for some kind of cow-shedding is admitted to be essential to any modern system of dairy farming. It is a comparatively easy matter for those who wish to obtain books giving plans and diagrams of dairy buildings such as obtain and are considerd efficient in Europe and other countries, but it is open to question whether any of the more widely published plans are entirely suitable to this country at the moment. In the opinion of the writer, the style of building indicated in the sketch herewith possesses distinct advantages over a shed which is either entirely enclosed or is open on both sides.

The functions of a cowshed are as follows:—(a) To protect the animals from the cold wind, heavy driving rain, and if it should be necessary to keep them in during the day, from the heat of the sun, and generally to ensure their comfort; (b) to facilitate regular and proper feeding; (c) to enable milking to be carried out expeditiously, efficiently and with

the greatest possible cleanliness; (d) to facilitate the supervision of the work of milking and feeding by a European.

The following points should be avoided in building:—(a) Unnecessary expense; (b) too close or warm an atmosphere at night; (c) the possibility of a through draught, except at a height of some feet above the backs of the animals.

Let us consider the foregoing in order. Protection from prevalent cold winds is easiest obtained by a solid wall not less than 8 feet high on the windward side. In hilly parts, such as Mazoe and Glendale, the direction of the prevalent cold wind varies considerably, but over a large part of the watershed of Rhodesia a shed having its back to the S.E. or E. will give all the necessary protection.

Protection from heavy driving rain may be amply provided by a thatched roof. In temporary buildings, even if the thatching be not of the best, and a slight leakage takes place during heavy down-pours, little harm will be done. The thatched roof undoubtedly provides the best protection from sun and heat. If iron is used, a space between the iron and the top of the wall of at least 1 foot should be left, in order to have a continuous draught under the iron, but well above the cattle. With regard to general comfort of cattle, of which a good dry bedding forms no inconsiderable part, it is obvious that bedding may be more economically and satisfactorily provided in a shed than in the open.

It has been consistently recommended by this Department for some time that, with few exceptions, the farmer will be well advised to take a certain number of his best cows with the object of managing them intensively as dairy cattle, and to refrain altogether from milking the balance of his herd, rather than to milk the whole herd indiscriminately, and to run them in an open kraal in accordance with the old South African or native custom. If this view be accepted as correct, liberal and perhaps expensive feeding cannot be economically undertaken in the open kraal or when cattle are running loose. If, however, the cowshed be provided with a good, strong, clean manger, with partitions arranged so that each cow may enjoy her feed unmolested, then each cow or group of cows may be economically fed on such rations

as her or their milk yield may warrant, and all waste may be avoided. If the manger be so constructed as to allow of a feed passage behind it, the work of putting rations to the cattle will be very much simplified.

It is a very difficult matter for the busy farmer properly to supervise the milking of his cattle if they be running loose in a kraal. If he wishes to check the amount of feed each cow gets, the amount of milk each calf gets, and the completeness of the milking, he will need to be running hither and thither all the milking time, and even then he will rarely be able to attend to these matters satisfactorily. Then again comes the question of dirt and dust and the uncleanly habits of native milkers. If the cows are tied up, each in her accustomed place, before milking begins, the exercise of a little organisation and system renders it possible to give efficient supervision with a minimum of trouble. Difficulties may still exist even with the best of shedding, but no modern system is possible in the open kraal, whereas even native servants may be quite reasonably trained when proper shedding and feeding facilities are provided.

The writer would especially emphasise the economy and advantage of the feeding passage, which not only makes possible a great saving of time in giving out rations, but enables a supervisor to watch each individual cow without disturbing her; to watch her feed; to watch the milking, and to watch all the calves, if calves are suckled. Moreover, it enables this to be done in the dry on the wettest days, and tends to lessen that feeling of disinclination to give personal supervision which sometimes attacks even the most energetic and enthusiastic of dairymen.

Temporary buildings are, as a rule, the most expensive kind one can build; they are, however, often expedient, and indeed, if they be erected with a certain amount of thought and care, their cost over a period of three or four years (which may be taken as their average life) will not perhaps exceed the interest on the money which permanent buildings would have cost.

The accompanying sketch is of a permanent building of brick, thatch and hard wood poles. Apart from the ques-

tion of the relative economy of a permanent or temporary building, all that is essential is that the end and back walls should be solid (*i.e.*, pole and dagga, dry stone or any other suitable and cheap material), that the manger should be firm and clean, and that the dimensions of the shed should be not less than those indicated. The feed house is perhaps not essential in the strictest sense of the term, but it adds so much to the ease and efficiency with which rations may be mixed and fed, that it may almost be regarded as essential.

The type of roofing shewn in the sketch is suggested as being suitable in localities in which it is difficult to obtain native timber of sufficient length and straightness to build an ordinary full span roof. What may be called the verandah at the back of the cows has not the recognised slope for thatching, but the writer suggests that, if suitable timber be scarce, such a verandah will serve its purpose for a year or two, and may be replaced by iron at such time as an opportunity for obtaining iron cheaply presents itself.

By taking the uprights supporting the manger and the heel posts of the divisions right up to the beam, and bolting them to it, very light poles may be used, because the system has the effect of bracing and tying the whole building together in one frame-work, as it were. Apart from these considerations, a sloping iron roof from back to front, or a full span roof, are merely matters in which the farmer may suit his own inclination and pocket. The open front should not, in the writer's opinion, be more than 7 ft. 6 in. clear from the ground. In the case of a full span roof, the back wall may be the same height.

The sketch shews a gutter behind the stands. In some town areas a gutter is insisted on, and, while there can be no doubt as to its value, it is not absolutely essential on farms in shedding which is open to the N. or N.W. all day, and which is practically only used by the cows at night. Under such conditions a good gravel or shale bottom will suffice until funds admit of putting in a permanent floor.

When permanent solid buildings are to be erected, then, in order to avoid unnecessary expense, the dimensions recommended should be closely followed, as they have been found

satisfactory, and have been selected with due regard to efficiency combined with economy in material. With regard to the brickwork, 4½ in. work will be found sufficient, provided that 14 in. buttresses are built to take the weight of the roof. These buttresses should protrude on the outside, so that they do not interfere with the clear 3 ft. 6 in. of the feed passage. The manger may be of iron or wood or brick and cement. In the case of the latter, the front should have a top rail of wood, to which fastenings may be attached, otherwise brickwork is soon pulled to pieces. The most suitable kind of permanent flooring, and the cheapest, will probably be found to be bricks laid on sand and grouted in with cement, the gutter being more carefully cemented or perhaps faced. Medium-sized stone or flagging may, of course, be substituted for bricks. A rough floor is better than a very smooth cement one, but it should in all cases be well grouted, so that it is non-absorbent. The type of manger shewn is not quite in accordance with standard measurements in Europe, it being rather higher. The standing space (*i.e.*, front of manger to inner edge of gutter) is longer than is usually recommended. If it is decided to have mangers of a European type, with patent iron fittings and yokes to keep the cows in place, then the European manger and standing space are correct. It is thought, however, that such fittings are too expensive for our present needs, and that, with native labour and the conditions under which we farm, they would seldom last long in good order. The manger then having a height in front of 1 ft. 6 in., with a standing space of 5 ft. 9 in., will be found convenient, because the cows tied with reims or chains only lie with their heads back from the manger and will require the greater length. The higher type of manger lends itself to other uses, such as feeding horses and mules, and, with the guard rail overhead, does not allow of cattle stepping into it.

It is within the writer's experience that cattle in this country which are enclosed in a good building of European design at night, feel the cold unduly when turned out on a winter's morning. It is not likely that we shall, as a rule, find it profitable to stable our cows for the greater part of the day, as is the practice in winter in other countries, and it would, therefore, seem advisable to build shedding that will

give reasonable protection and at the same time keep the cattle hardy and accustomed to the open air.

It has often been suggested to the writer that a shed having a span roof, a feed passage down the centre, and stalls arranged head to head would be more economical than one of the type now recommended. While this is so as far as cost of building is concerned, such a cowshed has one serious drawback. If it is open on both sides, a through draught will be created, and the cattle will be much colder than they would be in the open. If both sides are built up partially there is less objection, but then one has to provide dunging passages, and little economy in building is achieved. If one side only is built up, then half the cows are too far under the shed, and are too warm, whilst the other half are insufficiently protected.

No good purpose would be served by including an estimate of cost in this article; labour, material and building facilities vary so much in each district, and indeed on every farm. The sketch herewith is intended to convey an idea of the way to build, and makes no pretensions to being a builder's plan. The number of stalls may, of course, be increased in accordance with the number of cows it is desired to house. If, however, the "three sides of a square" idea is to be carried out, it will be found advisable to stand at least 15 or 20 cows along each side, in order that the square itself may not be too close and confined. The following is a summary of the dimensions recommended, and it is hoped that they will enable farmers to reckon up the cost of erection under their own particular circumstances:—

	ft.	in.
Height of back wall—		
If for a span roof	8	0
If for a roof as shewn in sketch	10	0
Height of front supporting posts—		
For a span roof	8	0
For a roof as shewn in sketch	7	6
Total inside measurement from back to front ...	14	2
Width of feed passage	3	6
Width of manger over all	2	0

	ft.	in.
Height of manger at back	2	6
	(or 3 ft.)	
Height of manger in front	1	6
Depth of manger (approx.)	0	9
Length from front of manger to inside edge of gutter	5	9
Length from front of manger to back of heel post of division	4	0
Width of gutter	1	2
Depth of gutter on side nearest cows, up to	0	3
Depth of gutter on side away from cows, up to ...	0	4
Length from outside edge of gutter to outside of shed	1	9
If no gutter is used, the length from front of manger to outside of shed is	8	8
Height of division	4	0
Width between divisions for two cows	7	0
Length of shedding required per cow	3	6
Height of guard rail (from ground) immediately above front of manger	4	0

Slope for standings, dunging passages, etc. (approx.) 1 in 24.

Vermin.

By Eric A. Nobbs, Ph.D., B.Sc., Director of Agriculture.

In view of the frequent complaints made by farmers as to injury and loss caused by vermin, it was thought well to make enquiries as to methods pursued in other Colonies similarly situated regarding the destruction of such pests.

The information obtained seems on the whole to indicate that no very satisfactory means exist whereby Governments, as such, can effectually secure the elimination of vermin, and the presence of even dangerous carnivora in parts of Africa comparatively long and closely settled indicates the small success that has been attained. The enquiries made lead to the view that the successful destruction of vermin in any locality is essentially a matter for systematic joint action of the inhabitants, and that it is not one method or another so much as vigorous and willing co-operation of all interested that brings about the desired result. The general persistence of certain forms of vermin, particularly such comparatively defenceless forms as jackals, baboons and spring hares, is in itself a sign of the general lack of the necessary willingness to participate in any joint action. This common and regrettable trait is as evident, unfortunately, in Southern Rhodesia as elsewhere. The temporary personal inconvenience associated with a joint hunt, for which other work, or pleasure, would have to be suspended, or the transitory annoyance connected with tying up all dogs whilst simultaneous poisoning is practised, and such like trivial considerations, are allowed to stand in the way of a public benefit. It would almost appear in some cases as if the benefit that may be derived by others is a deterrent to action. The small cost of a bottle of poison is allowed to stand between a farmer and a menace which he eloquently describes as costing him untold loss in sheep or calves, or bags and bags of mealies. Similarly many sufferers refuse to take measures to protect themselves

without the promise of a direct reward from the State. This can be well understood in the case of natives or persons who suffer no loss and to whom such a premium would be a material gain, such as professional hunters or trappers of vermin, but hardly in the case of responsible land owners or stock raisers.

The dissemination of disease amongst wild animals as a means of destruction is not infrequently mooted, particularly against baboons. It is true that such a procedure has been devised against field rats and mice in Europe—the much discussed mouse bacillus and rat typhus—but plagues of small rodents still continue. A fungus disease of locusts has been tried, but has been discontinued, after fair trial, in South Africa. A remedy on these lines is more easy to suggest than to carry out. First, the disease has to be found—not an easy matter amongst wild animals; next, it must be of a contagious nature, but incommunicable to man, and capable of being artificially kept going in caged animals or in culture form, and finally it must be readily spread amongst the victims. Strychnine, traps or bullets seem simpler and more likely of success. In Rhodesia, where lions and buffalo are vermin, the former is usually considered worth shooting on his own merits; the latter is now found in haunts remote from habitation. The elephant, hippopotamus and rhinoceros are protected game, and individuals only allowed to be shot when they become a nuisance or a menace. When funds were more plentiful than of late, the animals included as vermin for which rewards were paid out included lion, cheetah, leopard, the crocodile and its eggs and the hyæna, whilst in actual fact bush pig and wart hog, crows and numerous small birds deserve to be put in the same category, not to mention civets, polecats, maishonds, *et hoc genus omnes*. In the Union we find defined as vermin also the mamba, aardwolf, ratel, silver jackal, maanhaar jackal.

The following particulars with regard to the methods practised against wild dogs in Australia were furnished in response to enquiries by the Director of Agriculture for New South Wales:—

> "Strychnine baits are used on a trail prepared by dragging round the burnt carcase of a sheep, care being taken that the baits are not handled by the person setting

them. (The usual practice is to use an old fork.) The baits are buried to a depth of about three inches. This has been proved to be a good way of poisoning young dogs and puppies, but not altogether satisfactory for older dogs, unless they are hard pressed for food.

"Trapping is regarded as the most effective method of combating the pest. In some cases a heavy log is drawn along in country where dogs are thought to make their abode, the process being repeated until a soft pad has been made (the experience being that the dogs prefer a soft pad). Spring jaw dog traps are then set at intervals (up to $\frac{1}{4}$ mile in places). Some trappers adopt the practice of covering the traps with a cloth which has been saturated with a poison mixture. One method of attracting the dogs to the traps is to lead a domesticated bitch in œstrual heat round about where dogs frequent, finally secure her by a strong chain and then set the dog traps round her.

"Shooting is carried out by parties and single shooters, also by spring guns. In using spring guns, a spot is selected where a regular dog pad is found, brushes are arranged on opposite sides of the track, and between them a connecting piece of string is tied, to which a gun is attached, pointing at the point of contact of an animal with the connecting string. The gun is, of course, fired from a spring released by the disturbed string."

In the Transvaal and the Free State no rewards are paid for the destruction of vermin. In the former province a scale of rewards exists, but the regulations are in abeyance. In the Free State, the law allows of payment to vermin clubs at the rate of 5s. per head, but for the past two years no payments have been made. In Southern Rhodesia, till recently a liberal scale of rewards existed, but this is now limited to 5s. for wild dogs only. The Cape Province pays £1 for tigers, 5s. for jackals and lynx, and 1s. for baboons. Natal alone has an elaborate system in force covering leopard, cheetah jackal, wild dog, baboon, crocodile and mamba, and varying from £1 to the humble "tickey."

On the whole, experience has shewn that this method of encouraging farmers to benefit themselves has not led to

any notable diminution in vermin, nor has the suspension of these payments been marked by any great increase in their numbers. Where the damage is of real consequence, it is worth while to kill them for nothing. The laws which provide for payment of rewards for vermin have had to be armed with complex machinery against fraud, which is easy, particularly in connection with the presentation of "proofs." Regulations governing payments are hedged round with precautions rendering the process unavoidably cumbrous, but found to be indispensable, owing to past experience of most wonderful and successful fakes in this connection. In Australia, the Government does not give rewards for wild dogs—the only wild carnivora in the country—but the local Pasture Protection Board in one district subsidises two associations for the purpose of dealing with wild dogs on the pound for pound principle, with a maximum of £40 in each case, also paying 10s. each for skins and 2s. 6d. a head for pups. The Government in the Cape supplies strychnine, and that of the Free State is empowered to distribute poison at cost price to vermin clubs, but apparently little use is made of these facilities, which offer no particular advantage over purchase through the ordinary trade channels. Strychnine seems to be the favourite and most convenient poison for the purpose.

The most recent specific legislation on the subject in South Africa is the "Vermin Destruction Ordinance, 1914," of the Orange Free State, which encourages a system of vermin clubs to secure joint action and proper control of measures for killing vermin. To these bodies alone may rewards be paid, at the rate of 5s. per head of vermin killed, though no such payment has been made during the past two years. Where a vermin club exists, no one may lay poison for vermin except under its control, and the Government may supply the club with poison at certain prices. Where a farmer takes no steps to exterminate vermin on his land, the vermin club may be empowered to step in and do so. Dogs used by vermin clubs are, whether for hunting or for breeding hunting dogs, exempt from taxation in the Free State. In Natal, one pack of hounds is owned by private individuals to keep down jackals, whilst in the Cape packs of fox hounds are subsidised at the rate of £30 per pack of not less than five dogs.

A select committee of the Cape Provincial Council recommended in 1913, *inter alia*, "that the use of dogs be encouraged as the most practical way of exterminating carnivora, and that financial assistance be given by Divisional Councils towards the upkeep of dogs." In view of this accepted pronouncement, it is curious to find that the funds from which rewards are given by Divisional Councils for vermin are derived from powers given these bodies to levy a tax on dogs, which is ear-marked for this particular purpose, and supplemented from the general revenue.

For the destruction of vermin, the use is generally permitted of means prohibited against game, such as nets, spring guns, snares, gins, springs, poison and traps, but the traps must be provided with devices to prevent their catching buck, and in some cases the use of pit-falls is particularly prohibited. In Natal and Zululand, drives with the special object of exterminating vermin are allowed under police supervision on Crown land game reserves and native reserves.

For much of the information collected above acknowledgment is due to the respective secretaries of the provinces of the Union and the Director of Agriculture of New South Wales.

In connection with this subject, readers interested may be referred to the following laws and regulations:—

Handbook of the Game and Fish Preservation Laws of the Transvaal Province, 1912.

Addenda to the Game and Fish Preservation Laws of the Transvaal Province, 1913.

Ordinance 4 of 1914, Orange Free State Province.

Ordinance 13 of 1914, Orange Free State Province.

Act 40 of 1889 (Cape of Good Hope), Sections 221-232 of Div. III., Sub-division V., Part I., and Section 278 (9).

Destruction of Wild Carnivora; Regulations for Payment of Rewards. Provincial Notices (Cape) No. 199 of 1913 and No. 275 of 1913.

Game Regulations Provincial Notice (Natal) No. 221 of 1912, Regulations 26, 27, 28, 29; and No. 265 of 1915.

Reward for the Destruction of Wild Dogs, Government Notice No. 201 of 1916.

Salisbury Show, 1916.

Cattle.—In spite of the many difficulties which still militate against the holding of a representative show of cattle in Salisbury, the society decided this year to open classes for bulls and slaughter oxen, for which they were amply repaid.

The number of bulls was naturally not large, some 18 or 20 being exhibited, but the quality left little to be desired. Just as the Shorthorns were the leading feature of the Bulawayo show, so the Herefords commanded the attention of everyone at Salisbury. Mr. D. Black secured premier honours with his young bull "Bugler," recently purchased from Messrs. Cooper & Nephews, thereby beating such notable animals as Messrs. Bernstein & Son's "Devonby Dreadnought" and Mr. Jack Mack's "Peerless," besides four other really excellent bulls, the property respectively of Mrs. F. Clayton and Mr. A. W. Partridge. One wished one could have seen the Bulawayo Shorthorns and the Salisbury Herefords paraded at one show. The Coates Shorthorns and Lincoln Red Shorthorns had one representative each in Mr. Woodforde's "Prince Worcester" and Mrs. F. Clayton's Lincoln bull. They had, of course, no competition in their respective classes, but "Prince Worcester," which, it will be remembered, was the runner-up for the trophy at Bulawayo, was subsequently awarded the championship of the show, Mr. Black's "Bugler" being the reserve number. The Frieslands numbered four, all good, Mr. James English's two Oldenburgher Wesermarsch bulls being first and second, with Mrs. S. Smith's colonial-bred bull third. Mrs. Smith's bull lacked a little in condition, or he might have done more. While we have nothing but praise for Mr. English's two splendid bulls, we would point out that they, although fully pedigreed, are admittedly a dual-purpose breed. They are not really Frieslands, and should not, strictly speaking, be shewn in a class for Friesland cattle. The South Devon class produced two

competitors, Mr. Browning's good bull beating a smaller animal owned by Mr. Duncan Black. Mr. A. W. Partridge sent his Aberdeen Angus and Sussex bulls, but unfortunately no one appeared to contest the award with him. Both animals were in fine fettle, and well worthy of the judges' notice. We were sorry to see the North Devons unrepresented, especially as several very fine specimens are to be found in Mashonaland.

The classes for slaughter cattle were fairly well filled, and provided an item of much interest to breeders. There is little doubt that the Mashonaland mealie farmers have grasped the value of good sires and good feeding as well as their brethren of Matabeleland and will be well to the fore with first-class beef whenever a regular market presents itself. In the classes for grass-fed bullocks, only two animals were exhibited. It is evident that the time has passed for classes of this kind, and we understand that in future no distinction will be made between grass- and stall-fed beasts. In the stall-fed classes, Mr. D. Black was the only exhibitor in the junior class, with a half-bred Hereford-Mashona ox, about 18 months old, which scaled 1,025 lbs. alive, and subsequently won the block test with a dead weight of 607 lbs. In the class for oxen with six teeth and under, Mrs. F. Clayton was placed first and second with two very nice half-bred Herefords, the best of which had only four teeth up. Both scaled 1,220 lbs. alive. In this class the Department of Agriculture also shewed six beasts which had formed part of an experiment, and are fully dealt with in another article in this issue, and Mr. Eastwood shewed a well-fed half-bred Aberdeen Angus steer. In the class for bullocks with over six teeth up, Mr. T. E. Duncan's half-bred Aberdeen Angus-Angoni steer, aged, was placed in front of Mr. D. Black's second cross Lincoln Red, their respective live weights being 1,360 and 1,690. Other bullocks in this class were two half-bred Herefords, the property of Mrs. F. Clayton, one half-bred Aberdeen Angus, shewn by Mr. Eastwood, and a couple of nice grade Shorthorn bullocks from Mr. J. O. Gibson's farm. There was also a useful bullock sent by Mr. E. Bradfield. After the oxen had been judged in their various classes, the first prize beast and such others as the judges wished were selected for slaughter, and judged by the block test.

At the sale of slaughter oxen held on the show ground, prices ruled from 37s. 6d. to £2 per 100 lbs., which, considering the rather large number of beasts offered, was a very fair price. We would point out that in connection with the block test competition, which is a most interesting and instructive one, the thanks of breeders and feeders are due to the butchers of Salisbury for their ready and practical co-operation with the Agricultural Society, without which the test could not be conducted.

Block Test Competition.—A most interesting and instructive "block test" competition was again carried out at the Rhodesian Agricultural and Horticultural Society's meeting at Salisbury in July. The system of judging was as follows:—The slaughter bullocks in the various classes were judged alive in the ordinary way, and the first prize bullock in each class, and such others as were selected by the judges, were then entered to compete in the block test. They were slaughtered and placed before the judges on the following day, and judged according to points. The accompanying table shews the awards and the points given. These cattle were specially fed for show purposes, and it is gratifying to note the weights which it is possible to obtain on our local half-bred and grade cattle, and the benefit of using high-class beef bulls when it is sought to produce beef cattle is clearly demonstrated.

Hay Making on Mr. T. W. Savory's Farm, Hartley.

Catalogue No. of exhibit.	Prize awarded.	Owner.	Breeder.	Type of beast.	Permanent incisor teeth up.	Live weight.	Dead weight.	Percentage of carcase to live weight.	Weight of hind quarters.	Weight of fore quarters.
16	First	D. Black ...	Owner ...	Half-bred Hereford-Mashona	None	1,025	607	59·21	315	292
26	...	J. E. Dawson ...	C. C. Macarthur	By a Polled Angus bull out of an Angoni cow	Eight	1,360	869	63·89	497	412
29	...	D. Black ...	E. A. Hull ...	Second cross Red Lincoln Shorthorn	Six	1,690	1,016	60·12	517	499
18	...	Mrs. F. Clayton	Owner ...	Half-bred Hereford ...	Four	1,220	709	58·11	364	345

Qualities for which points were awarded.	Possible points.	Catalogue Number. 16.	26.	29.	18.
Proportion of carcase to live weight	50	44	50	45	43
Weight for age	20	20	14	20	16
Quality of meat	20	20	14	18	16
Proportion of hind quarters and more valuable meat to fore quarters and less valuable meat	10	6	10	5	5
Totals	100	90	88	88	80

The Pig classes were better filled than we remember to have seen them at any previous Rhodesian show, and, generally speaking, the quality and condition was good. Mr. H. Basil Christian certainly owned the pick of the bunch in his two Large Black sows and a boar. Mr. Pascoe and Mr. G. W. V. Knight divided the Berkshire honours, while Mrs. A. Tyas and Mr. David Templeton shewed some bacon pigs of excellent quality.

Sheep.—In the sheep classes, as usual, very little interest was taken, and beyond some Merinos shewn by the Department of Agriculture and some nice half-bred slaughter lambs shewn by Mr. H. D. Rawson, there was little of note. It seems to us regrettable that more interest is not taken in slaughter sheep, for which a good market undoubtedly exists, and we sincerely hope that efforts may be made to improve these classes in future.

Maize and Agricultural Produce.—Both in quality and quantity the maize exhibited this year surpassed anything previously seen at the capital show, and the winners in every class had to face very severe competition. Previous prize-winners were again in evidence, Mr. J. E. Dawson in the Hickory King classes and Messrs. McLean & Howie in the Salisbury White classes figuring prominently in the prize lists. These gentlemen are to be congratulated on the uniform excellence of their numerous exhibits, and it is gratifying to know that their supplies of seed were sold out early. Among other prominent winners were Mr. F. C. Peek and Mr. V. W. Fynn, of Mazoe. The produce, apart from maize, although good in many individual cases, was not up to the standard that might reasonably be expected in the centre of our agricultural districts, nor was the competition as keen as circumstances undoubtedly warrant. This remark, however, does not apply to the excellent displays shewn in the competition for the inter-district cup. In this case without any doubt a very high standard was reached, and the variety of agricultural and other produce exhibited would do credit to any show in South Africa. The judges had a difficult task, and in making the award, consideration was taken of the quality of each group of exhibits, the total number of exhibits and the general

get up of the display. The marks obtained by the two leading districts are appended for information.

Marks Obtained by the Mazoe and Enterprise Associations:—

	Maize. 20 marks.	Tobacco. 10 marks.	Citrus: 20. Other fruit: 5. 25 marks.	Fibre. 5 marks.	Cereals. 20 marks.
Mazoe -	17	9	23	2	18
Enterprise -	14	6	12	2	17

	Winter fodders. 10 marks.	Miscellaneous. 10 marks.	Add for any other feature, including general get up. 20 marks.	Total. 120 marks.
Mazoe -	8	8	13	98
Enterprise -	6	7	15	79

Butter and Cheese.—We cannot do better than quote the report of the judge (Mr. W. Elliot) on this subject, as published in the "Rhodesia Herald," which is as follows:—"In no department of farm work is instruction more needed than in the production of butter and cheese. Most farmers produce butter, but close examination proves that it lacks in a great many respects. The exhibits in the produce hall revealed this, and the difference between the best and the worst was considerable. Some of the exhibits would not have been placed on the tables had the exhibitors understood the qualities that go to make good butter. Some greater uniformity of conditions is required to bring the exhibits closer together. For instance, some samples lacked much in marketable condition, and the paper in which they were wrapped was not even grease proof, and in consequence adhered to the butter. It might also be well if the committee provided score cards, to be marked up by the judges, so that competitors could see

the directions in which they fell short. In both the salt and fresh butter classes a competitor was disqualified for carelessly allowing his name to appear on the exhibit. The total number of entries for fresh butter was 17, and the first prize secured 86 points, the second 84, whilst 83 points obtained a v.h.c. In salt butter 87 points took first prize, whilst the second prize obtained only one point less, but after these, there was a considerable falling off in quality, greater than was shewn by the fresh butter. The prize winners were good samples, but it would perhaps be well to consider the advisability of following the Rand custom of awarding a special certificate to all butters securing 90 points and over. The cheese competition drew four entries, of which only one was a really commercial article. This one, the prize winner, was indeed excellent, and the production of similar cheese generally would undoubtedly result in the founding of a firm market."

The prize-winners were as follows:—Mrs. D. R. Templeton, 1; Mr. C. G. Hards, 2. Best 2 lbs. of butter in 1 lb. pats:—Mrs. D. R. Templeton, 1; Mrs. Strickland, 2; Mrs. C. Willmot, Mr. J. W. Palmer. The prize for the best cheese was won by Mr. F. E. Goodridge for a really excellent product. In cream cheese Mrs. Harold Christian was first, and Mrs. S. South second.

The B.S.A. Company's Bacon Factory had their usual attractive exhibit. For home grown and cured bacon, Mrs. C. Willmot secured first for the best ham and Mr. W. J. Woods second. Mr. W. J. Woods was placed first for the best side, second for the rolled side of bacon, and first for lard.

Poultry.—The exhibit of poultry was a very large one indeed, and in the opinion of Dr. Little, the noted authority in the Union, who came up to judge them, a very excellent one. Dr. Little's advice, when speaking at the farmers' dinner on the evening of the show, was:—"Don't import from overseas. There are as good or better birds in South Africa and the Union as any you can get overseas, and the best thing to do is to breed from them." The prize list of the poultry section has, of course, been published in full in the press, and we must for want of space refer our readers to it for details.

Implements and General.—The display of farming machinery, which is usually so interesting and instructive a feature at our shows, this year was not as extensive as usual, owing doubtless to war conditions, and several firms generally to the fore did not exhibit at all. At Salisbury show, however, quite a number of high-class implements were on view, including a few novelties. It should be mentioned that several of the firms also sent their Salisbury exhibits to the Umtali, Hartley and Rusape shows.

Lack of space precludes our dealing with all the machinery stands on the Salisbury show, but the following deserve a few remarks:—The Anglo-African Trading Co. put on a complete range of their well-known Deere and Koodoo ploughs; also a maize shelling outfit consisting of engine and boiler of the Britannia type with a Marshall sheller. This firm made a speciality of the Bentham (English) feed cutting machines, which they had at work cutting food for the cattle section. They also shewed the first imported wagons made with tyres to comply with the Tyres Ordinance. In addition they had on the ground full lines of harrows, cultivators, dairy utensils, etc. Mr. Gerrans exhibited wagons with wide tyres, to comply with the Ordinance, made locally. The Bechuanaland Trading Association were, as usual, well represented with their Ransome Disc Key-Conqueror ploughs, and complete series of dairy utensils. Their Ransome Homestead sheller and engine of small size is likely to suit grain growers on the small scale. It will husk and shell 225 bags a day, or shell only over 500 bags. The Spalding deep ploughing machine attracted notice. There are some of these already at work in the country, giving good satisfaction. The Nonpareil wheat drill, English make, suitable for other small grains, was also shewn by the B.T.A. It has an excellent reputation, and has been in use for years in the Hartley district. Messrs. A. F. Philip & Co. had a Petter Junior five-brake oil engine on the ground, running a 12-inch Inkoos mealie mill. At the same time they advertised their famous Melotte separator and the popular Fison fertiliser, besides other interesting exhibits. There was a good show of motor cars and cycles, which attracted many visitors, and we were particularly impressed by Messrs. Puzey & Payne's show of beautiful Hupmobile and

Dodge cars, and several fine lines of motor cycles. Messrs. E. W. Tarry & Co. had their usual display of farm implements of all kinds, including the Avery ploughs, working models of windmills, and a small power mealie husker and sheller. Mention should also be made of the stand of Messrs. G. H. Williams & Co., where, besides a fine show of seeds and products, were to be seen the latest things in the way of garden implements.

Maize.

VARIETIES IN RELATION TO FEEDING VALUE.

In reference to a newspaper query from an anonymous correspondent on the relative composition of different varieties of maize, the Assistant Agriculturist states as follows:—The feeding value of maize depends very largely upon its protein content. Neither starch nor protein content depends on colour of grain, but, as the correspondent correctly states, is mainly a question of seed selection and breeding. Nor, again, is starch content higher in flint maize than in dent. From available analysis, the contrary would seem to be the case, although the difference is a slight one. Hickory King maize is perhaps the richest in starch of any variety, shewing an average on South African analyses of 76.64 per cent. of carbohydrates as against 73.98 per cent. in the best flint. The oil sometimes extracted from maize is obtained from the germ, the total amount forming only 4.5 per cent. of the whole grain. It is, therefore, a bye-product of comparatively little importance.

Citrus Fruit at the Shows, 1916.

By A. G. Turner, Citrus Adviser.

It is most gratifying to be able to record that there was a distinct improvement in the quality and quantity of fruit generally at this season's shows. Citrus fruits were well represented at Hartley, Rusape, Umtali and Salisbury shows, especially at the latter, where the display would have done credit to any agricultural show in South Africa, not only in the individual class exhibits, but also in the inter-district tents. I think it would not be out of place to remark here on the necessity for supplying a larger space for these inter-district competitions to enable the competitors to make a more effective display of the goods representing their different industries.

The exhibit of fruit in the Mazoe tent was very well got up and representative of the district, except that no boxes of oranges packed for export were shewn, otherwise this exhibit would have received full score for fruit. Enterprise fruit exhibit was fair, but too scattered to shew up well. A few good samples of oranges and lemons were shewn on the Umtali stand, which also contained a box of excellently packed oranges ready for export. Rusape's small exhibit of fruit was good, especially the apples.

At the Hartley show, in the class calling for a collection of citrus fruit, the exhibit tabled by Messrs. Knight and Folkestad consisted of some excellent fruit, but unfortunately some varieties were incorrectly named, and some not true to their type, whereas in the only other exhibit in this class, which was given first award, the fruit was not so good, but all varieties were correctly named and true to type.

The Washington Navel oranges from Mazoe Citrus Estate, which received first prize, were nice even specimens of good

fruit, while those from Messrs. Knight & Folkestad were even better, except that they contained numerous seeds, which is very detrimental to this variety.

First prize for Valencia Lates was awarded to Messrs. Knight & Folkestad for some really excellent fruit, while the Mazoe Citrus Estate exhibit was equally good, but rather uneven in size.

In the winning exhibit for Jaffas the best oranges on the show were undoubtedly seen, being heavy, juicy and well coloured, with few seeds, and typical of the variety. These also came from Messrs. Knight & Folkestad's orchard.

Mediterranean Sweets were poor, while Old Cape oranges were fair. Only one exhibit of seedling oranges was staged, and these were excellent.

Grapefruit on the whole were poor, while naartjes and lemons produced some fair samples. The best fruit amongst the naartjes were Old Cape from Mazoe Citrus Estate, although not awarded a prize, as one specimen was of the Emperor variety.

A splendid exhibit of smooth cayenne pineapples was staged by Messrs. Sworder Bros.

The display of fruit at Rusape was very creditable, and the association is to be complimented on its first show. Some excellent collections of fruit were exhibited, the first award going to the Premier Estate, Umtali, which also carried off the prize for the box of oranges packed for export.

In the Washington Navel class, a very fine sample from Mr. Boyd Clark was easily first, while the Premier Estate took first prize for some beautiful Valencia Lates.

Mr. F. Lapham shewed some good grapefruit, and Rhodes' Inyanga Estate an exhibit of apples.

The fruit section at Umtali was quite representative of one of the best citrus growing districts in the Territory, but it is to be regretted that several of the exhibits bore signs of being infested with red scale, and were consequently disqualified.

The Premier Estate again took first prizes for both the collection of citrus fruit and box packed for export.

In the class for Washington Navel, some exhibits were of very poor type. First prize went to Premier Estate, second to Sinoia Estate, and a "highly commended" to Messrs. Macdonald Bros., for some nice fruit, but very uneven in size.

Valencia Lates produced only a few entries, first award again going to the Premier Estate for what were undoubtedly the best fruit on the show. This estate was also successful in carrying off prizes for Jaffas and Mediterranean Sweets.

In the class for seedling oranges, Sinoia Estate was first with some very fine specimens, Mr. J. Meikle being second. In this class an exhibit of very fine Valencia Lates was staged by the Premier Estate, but was disqualified as not being seedlings in the true sense. A seedling orange is the fruit from a tree raised from the seed of a sweet orange, and *not grafted or budded.*

Lemons were rather disappointing, except for the winning exhibit, the others being of poor quality. No grapefruit were shewn, except one very poor exhibit. The various classes for naartjes produced some very nice fruit, Mr. A. Strickland's Old Cape naartjes being a particularly fine exhibit, probably the best naartjes exhibited at any of the shows this season. There were several good exhibits of pawpaws, for which Umtali is famous.

The display of citrus fruit at Salisbury show was in every way excellent and most satisfactory, and the society is to be congratulated on the enormous improvement since last year's show. It was most gratifying to find such splendid response from growers over many districts of Mashonaland in competing for the various classes in the fruit section. This is as it should be at this show, held at the capital of Rhodesia, and the most central point of the agricultural area of Mashonaland.

All the classes were well filled, and comprised the best selection of oranges yet exhibited in Rhodesia, most of which were quite suitable for purposes of export overseas. All the prize-winners were more than good, though some of the other exhibits were not really typical of the varieties they represented.

With regard to the individual classes, that calling for a collection suitable for export included many varieties unsuitable for this purpose. The exhibit which had the greatest number of varieties shewed a majority of kinds not fitted for export, also signs of scale and other defects. The collection from the Premier Estate, Umtali, won first prize.

Among the boxes of oranges packed for export, only one was correct in every detail inside and outside. First prize was given this exhibit from the Premier Estate. The box placed second had too many nails, whilst the others were inclined to be slack in the pack, and also had numerous nails.

In the Washington Navel class, the Mazoe Citrus Estate received first award for a splendid lot of even fruit, which opened up well, and second prize went to Mr. G. Lamb for some very nice stuff. The quality of the fruit in this class generally was excellent, although some exhibits were rather unevenly graded.

In Valencia Lates the Mazoe Citrus Estate again came out top, with the Premier Estate a very close second. Both these exhibits were tip top fruit, and for quality would have been hard to beat.

The Jaffa class produced some very fine specimens of oranges, an outstanding exhibit from Mr. W. M. Simpson taking first prize, with the Premier Estate second. The first prize exhibit was especially good and contained the most typical representatives of this variety exhibited at any show this year.

The Mediterranean Sweets were also a good class, the first prize going to the Premier Estate, and Mr. E. W. S. Montagu being a good second.

Some particularly good seedling oranges were shewn by the Sinoia Estate, being sweet, juicy and well coloured, with few seeds and a good appearance. Mr. A. R. Peacocke's exhibit in this class was also very good.

Among a large class of good fruit, the Premier Estate won first prize for an exhibit of very excellent lemons, the second being an equally good fruit, but rather uneven. Some few exhibits of grapefruit were fair. There was a large display of naartjes in three different classes, amongst which Mr. G. Lamb's Old Cape variety were really good.

Poultry at the Shows, 1916.

By Frank Sheppard.

Those of us who have been able to visit the majority of the agricultural shows held in Rhodesia during the past season cannot fail to have noticed the great improvement in type and quality of the exhibits in the poultry sections compared with previous years. In some of the smaller shows the number of entries was below that of 1915, but at Bulawayo and Salisbury, which we might term "The Palace" and "Manchester" of the Rhodesian poultry shows, we find, not only a great improvement in type and condition of the birds, but also record entries.

At these shows we naturally expect a higher standard of birds than we do at the smaller shows, as they are more or less fanciers' shows, whereas at Gwelo, Hartley, Umtali and Victoria, which are purely farmers' shows, we do not expect to see many birds bred for exhibition points. This general all-round improvement in the exhibits gives us a good idea of the number of first-rate breeding birds in the country, and we can look forward to a further improvement in the future. The quality of the exhibits in classes for Rhodesian-bred birds also shews that many breeders are able to keep the type and size, but in these classes many birds failed badly, chiefly owing to the exhibitor's lack of knowledge of the exhibition standard of his particular variety, and not knowing what to breed for. In breeding exhibition stock, a thorough knowledge of the required standard is, of course, absolutely necessary, also a knowledge of how to breed and mate up the pens to obtain this required standard, and to obtain the best results from your breeding birds.

In several cases, I am afraid, exhibitors who did not realise the difficulty in breeding really good exhibition type of birds in varieties, such as Rhode Island Reds and Silver Wyandottes, had little or no idea as to what standard of perfection their birds had reached till they saw them exhibited side by side with others.

The interest taken in the poultry was most encouraging, and the number of questions asked by both exhibitors and visitors is a clear proof that it is the intention of the majority of breeders to endeavour to produce better birds in the future.

According to the regulations of at least one show, we find the judges are prohibited from giving information regarding the points of the exhibits. True, the judge should not point out to Mr. Smith the many faults in Mr. Brown's bird without first gaining permission from Mr. Brown, but surely Mr. Jones can question the judge regarding the points of his own bird. Judges are always pleased to give information, and an unsuccessful exhibitor should never hesitate to make enquiries if he is at all in doubt as to why his bird has failed to gain an award.

Not only was there a great improvement in the standard of the birds, but also in the condition. This is one of the chief points an exhibitor should aim at. The majority of birds were in excellent show condition, clean legged, good combs and wattles and in good plumage, but there were several cases where the plumage had not webbed out satisfactorily, owing to the soap not being entirely removed from the feathers after washing. To enable this to be done thoroughly, three separate baths must be used when washing an exhibition bird, the first for thoroughly washing and removing all dirt, the second and third for removing the soap from the feathers.

The great improvement in the standard of exhibits at the smaller shows, Hartley, Gwelo, Victoria and Umtali, clearly indicates that the farmer is giving more care and attention to the breeding of pure-bred birds, and next year we sincerely hope to see at these shows, not better birds, but more of them, and better support given to the poultry section.

The entries in the classes for laying types of birds and table birds were in every instance surprisingly small. This should not be the case, as these classes provide for breeders of other than pure-bred birds, and should be well supported.

The classes for ducks and turkeys were usually well supported, and many useful birds were penned. The geese classes, as usual, received little support. This is not surprising, and we need not look for any improvement, as, although Rhodesia is one of the finest countries in the world for poultry in general, it is not suitable for geese. On a few individual farms there may be suitable land for geese, but as they are essentially grazers, compared with fowls as grain eaters, and turkeys as insect eaters, our long dry winter months, when the youngsters are growing, are not suitable.

The breeding of bantams in Rhodesia has not yet received much attention, but the excellent exhibits at Bulawayo show, specially in the Old English Games, indicate that a few individuals are taking up this most fascinating hobby.

The classes for fresh eggs were decidedly good in both quantity and quality. The size was good and the eggs were clean, but in several cases we found a great lack of uniformity, and some of the exhibits were not as fresh as they should have been.

The management of the poultry sections was highly satisfactory, especially at Bulawayo and Hartley, where the penning, care of the birds and prompt posting of the award cards was all that could be desired.

The poultry section of the Bulawayo show, which was organised and managed entirely by the Bulawayo District Poultry Club, was the best exhibition of poultry yet seen in Rhodesia, and the stewards at Hartley show are to be complimented on the manner in which they carried out their duties, considering the many difficulties experienced when only temporary accommodation is provided for poultry.

Uses of Dhal.

Dhal is coming into use as a stock feed for cattle and pigs in Rhodesia. To this end the pods are gathered off the bushes direct into bags, without cutting down the plants, and the beans and pods ground together into a meal. Mr. L. Black, of Stapleford, who adopts this method, informs us that one boy plucks 3½ bags per day, and that of this dhal-feed he harvested 2,458 lbs. per acre. Part of this, however, he also threshed out, and it is interesting to note that the proportion of husks to grain is as 2 to 3, which implies a yield of "chick-peas" of 1,472 lbs. per acre. It seems likely that stripping the dhal instead of cutting it down, will promote earlier flowering, and possibly prevent to some extent the losses due to early frosts, which last season in particular cut down dhal prematurely all over the country.

The manager of the Farmers' Co-operative Society, Salisbury, has kindly sent us the following information as received from London agents :—"The small shipment of dhal sent to London was distributed, and on the then ruling market it was reckoned it would realise 44s. to 45s. per 480 lbs., c.i.f., which was just about the value of maize at that time. The sellers report that it is extremely difficult to try any new grain at the present time, and it would seem that, to obtain the actual value of dhal, quite a lot of work must be done in introducing it to buyers. The chemists report that it is found to resemble the English pea as to its properties. It is very far behind the soya bean in its proteid and albuminoid matters, and has only a small percentage of oil. It can be used for human consumption, but in this case price would be the principal item to manufacturers."

Correspondence.

To the Editor,

Rhodesia Agricultural Journal.

TOPPING OF MEALIES.

Sir,

Possibly not every farmer is aware of the beneficial results from the topping of the mealie stalks while the crop is still growing. The benefits which I estimate can be obtained by the farmer are two-fold, viz., (1) increase of growth of the mealie cob, (2) valuable winter food for cattle in the form of ensilage.

It may interest your readers if I try and explain the reason for the two above statements. Presuming the mealies are sown at the usual time, say November or early December, the mealie stalks would be ready to top after the pollen has fallen and fertilised the cob; great care should be taken not to cut the tops until the cob is formed. From experience gained this year, I am satisfied that the experiment is well worth the consideration of all farmers.

I do not suggest that a farmer who grows 200 to 400 acres should top every acre, but to do as many as time and labour will allow. It is really on the same lines as the tobacco grower who cuts off the tops of his tobacco to improve the quality of his leaf. In the case of the tobacco grower, the tops are allowed to remain on the ground and decompose, whereas the mealie grower loads them on to a wagon, and places them in a pit to make ensilage, which he will find a great stand-by in the winter season. In the term "mealie grower" I wish to include the farmers who make mealies their principal crop and also the rancher who grows mealies for consumption on the ranch. In the former case, the mealie grower will find his pit of ensilage very useful to him during

the months of September and October, after all his stalks are finished, which is the time when the majority of trek oxen have their hardest work to do. The rancher will also find that ensilage made from mealie tops will be ready for use during the months of May and June, before his main pit of ensilage is ready to open.

It will be found after topping that the cobs are well filled at the tops and butts, as all the nutriment goes into the cob, and is not wasted in the stalk.

I found the quickest way was to give each native a piece of baling iron (which he hammers out on a rock to get an edge on it); they then each take a row and cut off the top of the stalk close to the cob; other natives follow, and place the tops on to a wagon to be conveyed straight to the pit.

When reaping takes place, the farmer is able to observe the work being done, whereas if the mealies are not topped, the boys may be sitting down comfortably out of his sight. I estimate that the increase in yield of grain alone justified the topping of the mealie stalks.

I may conclude by saying that up to the time of writing (30th July) I have been feeding my cattle on these tops, and have not yet had occasion to open my main ensilage pit.

H. K. Bracewell.

Ruia Estate.

[The practice advocated by Mr. Bracewell is worthy of attention. At least a month should be allowed to elapse after the appearance of the tassel flower before cutting is commenced. This will ensure complete pollination of any late cobs, and the tops themselves will be fitter for the purpose of ensilage than at any time earlier. A considerable increase in yield of grain must not, however, be expected as a result of this practice, and Mr. Burtt-Davy, quoting American experience, states that "topping results in a loss of grain." The ensilage made from the tops would be likely to compensate amply for any slight reduction in grain.—J. A. T. W.]

Departmental Correspondence.

Under this heading we publish correspondence between farmers and the technical officers attached to the Department of Agriculture, containing information which may be of interest and assistance to our readers.

A Bulawayo correspondent enquires as follows:—Could you kindly tell me whether any experiments have ever been made in Rhodesia in growing the carob tree (locust bean), and, if not, whether you would think it worth while to try? This tree seems to do very well in Southern Italy and Cyprus.

CAROB BEAN (*CERATONIA SILIQUA*).

The Assistant Agriculturist, in reply, says:—This tree has been tried successfully in several parts of Rhodesia. The oldest trees I know of are those growing on the farm Bannockburn near Victoria. These are 16 years old, and one of them is bearing fruit for the first time this season. Owing to the long period necessary for the production of the bean, we have never recommended the propagation of these trees for stock feeding purposes. I might also add that the carob has not much to recommend it from an ornamental point of view. Enquiries have also recently been made regarding the same tree under the name Algaroba.

The Agricultural Outlook.

The maize harvest is practically completed, but the heavy work of tabulating the statistical figures sent in to the Department is not sufficiently advanced to enable us to say how nearly the total yield will approximate to our estimate published last April. In parts of the country some farmers have reaped crops in excess of their estimates; while in others, where estimates were very low, crops are now returned as nil. The same remarks apply to some extent to the tobacco crop, but we understand that, generally speaking, the weight of leaf gathered comes well up to expectations. Such winter crops as have received irrigation are looking well, but the dry year has been unfavourable to the cultivation of vlei ground which in ordinary seasons can carry a winter crop.

Taking into account the fact that this is the most critical period of the year for live stock, and that the past season has been abnormally dry, reports on the condition of stock throughout the country are surprisingly satisfactory. The chief complaint is in regard to the shortage of drinking water in some districts, and, although poverty from scanty grazing is reported, this appears to be less marked and serious than in previous years, on account of so many farmers having made generous provision for winter hand feeding. On the whole, calving has been very successful in spite of the very dry conditions, and calves dropped at this season should have a better prospect when the rains come than those born later. The extent to which the veld has been damaged by fire varies greatly in different districts. In some parts grass fires have been conspicuous by their absence, whilst in other parts we hear they have been worse than ever before. It may be that in some districts the administration of the "Herbage Preservation" law is easier than in others.

Veterinary Report.

July.

AFRICAN COAST FEVER.

Salisbury and Mazoe Districts.—No fresh outbreaks and no cases of disease at any of the infected centres.

Mrewa District.—A fresh outbreak occurred at Mkarakati's kraal, about eight miles south-east of the original centre of infection at Mrewa's location. Amongst the cattle previously removed from Mrewa's location a re-infection occurred, two animals being affected; these cattle were on what was thought to be clean veld between Mrewa's location and Mkarakati's kraal, but it is evident from the appearance of disease at the latter kraal that the veld was not clean.

Melsetter District.—The following details were omitted from the June report. A fresh outbreak occurred on the farm Weltevreden. The mortality during the month was as follows:—Rookwood, 4; Woodstock, 2; Roslyn, 3; Mooswe, 6; Helvetia, 1; Jameson, 2; Weltevreden, 2.

During the month of July a fresh outbreak occurred on the farm Umzila amongst a small herd of native cattle. Mortality:—Rookwood, 1; Mooswe, 13; Jameson, 1; Woodstock, 1; Weltevreden, 1; Umzila, 1.

Gwelo District.—No fresh outbreaks. Two cases occurred on the infected farm Cross Roads.

MORTALITY IN CATTLE, CHIBI DISTRICT.

A number of animals died at Rusimba's kraal in the Chibi district. The movement of cattle in the northern portions

of the Chibi and Victoria districts was suspended, but as no trace of coast fever could be discovered by *post-mortem* or microscopic examinations, the restrictions were subsequently withdrawn, except in a small area around Rusimba's.

MALLEIN TEST.

The following animals were tested on importation, or prior to exportation, with negative results:—Horses, 34; mules, 62; donkeys, 166.

The return for June should read as follows:—Horses, 63; mules, 18; donkeys, 20.

TUBERCULOSIS.

Three heifers and one bull *ex* United Kingdom were tested with tuberculin, with negative results.

It was officially reported from the Johannesburg abattoirs that during the months of April, June and July four Rhodesian-bred oxen were on inspection of carcases found to be affected with tuberculosis.

IMPORTATIONS.

Horses, 33; mules, 32; donkeys, 41; heifers, 63 (6 *ex* United Kingdom); bulls, 29 (13 *ex* United Kingdom); sheep and goats, 2,031; pigs, 35 (*ex* Northern Rhodesia for Bacon Factory).

EXPORT OF SLAUGHTER CATTLE.

During the month 1,646 head were consigned to the Johannesburg abattoirs.

VETERINARY LABORATORY.

The Government Veterinary Bacteriologist reports as follows:—

Horse-sickness Experiments.—Three horses, case numbers 98, 99 and 100, the property of Mr. G. Austin, Mazoe, were inoculated with horse-sickness vaccine; two of these recovered, but a third (a mare heavy in foal) succumbed. It should be pointed out that the last three deaths have been with mares, and in applying the process female animals in foal or with foal at heel will have to be excluded.

Eight horses, case numbers 107 to 114 inclusive, the property of the B.S.A. Police, were inoculated; of these, seven recovered and one died.

During the month six horses were received from Kimberley for experimental purposes. Experiments are being conducted to determine what degree of immunity is conferred by the comparatively mild re-action conveyed by my vaccine, and to discover, if possible, a method of obtaining vaccine of a uniform strength.

Plasmosis Inoculation.—Five of the six bulls received from Great Britain during the past month have been inoculated. Four of these have suffered from an anaplasmosis re-action. This was of a very mild nature, and, although causing a well marked thermal re-action, gave rise to no clinical symptoms, the animals remaining in good condition throughout. It is doubtful whether a redwater re-action resulted from the inoculation; if so, it was of such a mild character as to be inappreciable on the temperature charts.

Experiments are now being carried out to ascertain what degree of immunity has been conferred against a mixed virus known to be of high virulence.

August.

AFRICAN COAST FEVER.

Salisbury and Mazoe Districts.—No fresh outbreaks and no cases of disease at any of the infected centres.

Mrewa District.—A fresh outbreak occurred at Chirimuti's kraal near Makawa's kraal, where an outbreak occurred in May. The affected animal was destroyed, and the remainder removed to a temperature camp on clean veld. One case of disease occurred amongst the Mrewa's location and Mkarakati cattle on the Munyukwi River. Owing to the poor quality of the grazing and the short interval dipping, a considerable mortality is occurring amongst these cattle. The dipping tanks for the native cattle in the Mangwendi reserve have been completed, and over 6,000 head are now regularly dipped.

Melsetter District.—No fresh outbreaks. The following deaths occurred during the month:—Cecilton, 1; Wolverhampton, 2; Weltevreden, 1.

Gwelo District.—No fresh outbreaks. Three cases of disease occurred on the Riverbend infected centre.

SUSPECTED POISONING, CATTLE, CHIBI DISTRICT.

Some further mortality occurred at Rusimba's kraal. *Post-mortem* lesions pointed to poisoning; microscopic examinations in each case negative. Blood from an affected bull was inoculated into a yearling steer at the Veterinary laboratory, with negative results.

MALLEIN TEST.

The following animals were tested with mallein on importation, with negative results:—Horses, 24: donkeys, 50.

TUBERCULIN TEST.

Twenty-five head of cattle belonging to the Rhodesdale Estate and seven belonging to the Central Estates, all imported from the United Kingdom, were tested with tuberculin, with negative results.

IMPORTATIONS.

Horses, 24; donkeys, 50; heifers, 60; bulls, 11; sheep and goats, 1,065.

EXPORTATIONS.

During the month 1,408 head of cattle were forwarded from Matabeleland to the Johannesburg abattoirs. Total to date, 7,392.

VETERINARY LABORATORY.

The following extracts on horse-sickness and plasmosis inoculation are taken from the monthly report of the Government Veterinary Bacteriologist:—

HORSE-SICKNESS.—Twenty-four horses, the property of the B.S.A. Police, were inoculated during the month. Of these, 2 died, 19 re-acted and recovered, 3 shewed no thermal re-action. Of the last three animals, two undoubtedly suffered from the disease, as indicated by the clinical symptoms during the second week after inoculation.

The following figures shew the results of the inoculation of Police horses to date:—Total treated, 71; 6 died, 2 "boarded" horses still on hand, 63 "salted"; that is 91.5 per cent. recoveries.

Experiments were continued with the six horses received last month from Kimberley. Two of these were inoculated with my vaccines and re-acted. On recovery, these and a third untreated horse were given equal doses of a virus known to be of deadly virulence, with the result that the control horse died on the sixth day, while the vaccinated horses remained healthy.

Further tests of a similar nature are being carried out to ascertain the degree of immunity possessed by vaccinated horses against different strains of virus.

Experiments are also being conducted with a view to standardising the strength and keeping properties of our vaccines.

Plasmosis Inoculation.—Five of the bulls received in May from Great Britain have been submitted to various experiments, and can now be discharged.

Three Hereford bulls and one Shorthorn were inoculated with varying quantities of "standard" plasmosis blood, and suffered from a mild anaplasmosis re-action, indicated by thermal elevation during a period of fifteen to twenty days. During this time the red blood cells were plentifully invaded by anaplasms, but clinical disturbance was inappreciable. The animals maintained their appetite throughout, and lost very little condition. This anaplasmosis was not preceded by any redwater re-action which could be detected by thermometer or clinical observation, although it must have been present, as shewn by the fact that in the case of the Shorthorn bull piroplasmosis, characterised by elevated temperature, blood invasion, but only slight clinical disturbance, was noted thirteen days after the cessation of the anaplasmosis re-action. The fact that No. 1 Hereford bull received, on recovery from anaplasmosis, blood from a four-year-old bullock from redwater veld and suffered no re-action, also suggests that the "standard" virus infects with a mild form of piroplasmosis, but sufficient to convey immunity.

Another "standard" virus was tested upon a second Shorthorn bull, and yielded a re-action, also mild, but less satisfactory than the first.

Although these bulls were finely bred, the pedigree of some of them extending back twenty generations, they were of favourable age and condition for inoculation. The re-action in them was not more severe than in the non-pedigree Shorthorn heifers inoculated in 1915. It is confidently believed that the inoculation of suitable imported bulls may now be undertaken when adequate accommodation is provided for the housing and treating of the animals during the process.

J. M. SINCLAIR,
Chief Veterinary Surgeon.

Farming Calendar.

October.

BEE KEEPING.

Bush bloom is now on, the queens consequently are laying vigorously, therefore give space and ventilation. In good districts, where stocks are strong, nectar may be coming in freely, and to prevent swarming it may be necessary to remove a crate of honey. By using the carbolic cloth, the operation is easily and quickly accomplished. At this season, whenever a crate of honey is removed, a properly fitted empty crate must take its place, otherwise the bees will swarm. Keep the apiary clear of weeds, and all hives well shaded. Feed any weak stocks.

CITRUS FRUITS.

Irrigation should be continued, followed by thorough cultivation, if no good soaking rains occur. From about the middle of this month to middle of next is the best time to plant orange trees, as they have hardened up their first growth, and if properly attended to will commence to grow right away, so that by the end of the growing season they will have put on considerable growth and established themselves well in the ground.

CROPS.

If ploughing has not been done earlier in the season, it should be undertaken as early as the rain will permit. A disc harrow or a roller should immediately follow the plough in order to break up the clods. In the case of new lands ploughed for the first time earlier in the season, an attempt should now be made to cross plough these. Permanent crops, such as Napier's fodder or dhal, will require but little attention, except a light harrowing between the rows to maintain the mulch. Castor beans should still be harvested as the pods ripen. It is not safe or advisable to plant any summer crops during this month. Winter wheats will be ready for harvesting, and the stubble should be ploughed in as soon afterwards as possible.

ENTOMOLOGICAL.

Maize.—Where circumstances permit the early planting of maize, cutworms and stalk borer are apt to inflict severe damage. See "Some Insect Pests of Maize," *Agricultural Journal*, June, 1912.

Tobacco.—Cutworms, stem borer and leaf miner are liable to be troublesome in the seed beds. See "Handbook of Tobacco Culture," published by the Agricultural Department, pp. 71-90.

Potato.—Defoliation by caterpillars is mainly to be feared. Use an arsenical wash.

Cabbage, Turnip, etc., sometimes suffer severely from diamond back moth and webworm. Spray or dust with an arsenical compound. See "Cabbage Webworm," *Agricultural Journal*, February, 1914.

Bean.—A few traces of stem maggot may be seen, but severe injury has not been noticed as early as October. See "Bean Stem Maggot," *Agricultural Journal*, April, 1913.

Citrus Trees may be sprayed for scale after the fruit has set. Resin wash should be used for this purpose. Fumigation is still more effective.

Deciduous Fruit Trees, including grape vines, are liable to attack from chafer beetles. See "Chafer Beetles," *Agricultural Journal*, December, 1914. Early peaches are frequently attacked by fruit moths, and choice varieties should be netted to keep these away.

Fig.—Fruit infested by fig weevil should be collected and destroyed.

FLOWER GARDEN.

All flower seeds, annual and perennial, may be sown as in September. A word or two on open seed beds may not be out of place here. These beds should be prepared in a sheltered position, and the soil should be well and deeply dug. This is more essential than at first thought, as in this state the soil when once watered is more easily kept moist, and is not so liable to cake. The top dressing should be free from all undecayed vegetable matter, and, when sown, the seeds should be covered with a thin dressing of fine light soil, over which a thin covering of grass may be placed to check evaporation. Transplanting from boxes or beds should be done on a dull day or towards evening; the plants should be well watered before being removed, and the roots disturbed as little as possible, care being taken that the latter have their full depth and spread when planting.

FORESTRY.

Prick out into tins any trees that are ready. If the ground is soft enough, harrow and cross-plough the land broken up in the early autumn. This is a good month for stripping wattle bark.

POULTRY.

Do not work the breeding stock too long. Early mated pens should now be broken up. Early hatched cockerels, which should have already been separated from the pullets, should be carefully watched, with a view to selecting next year's stock birds and those for market. All houses, specially those of the young stock, should be attended to at once, if they are not weather proof. Do not attempt to rear backward and weakly chicks through the wet season; they should be killed at once.

STOCK.

Cattle.—Ranching cattle on granite veld will in many instances be in fairly good condition on account of the early grass in the vleis, etc. On the diorite soils and later veld the cattle owner will still have to watch his weaker cattle carefully. In any case all supplies of hay, ensilage, majordas, etc., should be carefully husbanded in anticipation of possible late rains, but at the same time every effort should be made to prevent cattle becoming weak. Dairymen will need to feed highly both with succulents and green foods. Calves should be weaned and branded, if this has not already been done, and care should be taken that they do not suffer any serious set-back by reason of the want of veld. If calves are not desired in mid-winter, the bulls should be taken out of the herd now until the end of January. Care should be taken to provide a plentiful supply of clean water, and dipping must be regularly attended to.

Sheep. If spring lambs are expected, one should see that the sheep shed is in order, and that there is a supply of hay, ensilage or mealies for the poorer ewes in the case of late rains. All drinking places should be cleaned out, and care taken that the water supply is sufficient.

VEGETABLE GARDEN.

As in September, nearly all vegetable seeds may be sown. Early potatoes should be earthed up when reaching the height of about eight inches. In planting a small amount of marrow, melon, cucumber, and pumpkin, the writer has found it economical to sow the seed one in a tin and transplant when about four inches high in hills. A few cucumbers planted in this manner yielded nearly 400 a week for about two months. Sweet corn and mealies may also be sown this month.

VETERINARY.

White scour is prevalent in spring—November and December—but dipping is eradicating this disease. There is still danger from vegetable poisoning, and it will only disappear when there is plenty of good grass on the veld.

WEATHER.

This is apt to be a hot dry month, and rather trying, therefore, to man and beast, and the strong winds which blow at this season add to the general discomfort. Evaporation is, as a consequence, at its greatest at this time of year, and dams and pools lose most from this cause. The prevalence of veld fires at this time of year adds to the anxiety of the stock owner. The average rainfall in Mashonaland is from one to one-and-three-quarters of an inch; in Matabeleland one inch or so, and rather less in the Zambesi Valley. Generally speaking, the rain is more plentiful and earlier in the eastern districts, and takes the form of thunder showers at this time of year.

The rainy season has occasionally started early in October, but for practical purposes it need not be expected before the end of this month. The days are becoming warmer, and often even hot and oppressive. Clouds gradually collect, at first disappearing at sunset, but later becoming more persistent. Sheet lightning is usually frequent, and showers of gradually-increasing severity mark that the rainy season has set in. Steps should be taken in advance to provide for the run-off after such torrential rains, otherwise serious loss may result.

November.

BEE KEEPING.

Now that the first honey flow is on, be sure the hives stand level, whether working them for extracted or section honey. This is important, saving annoyance when preparing the product for market. Occasionally, where bees have not been thoroughly subdued, they object to the removal of honey; postpone the operation for 24 hours. Where increase of stocks is required, artificial swarms can now be made. Use care in storing honey.

CITRUS FRUITS.

If no appreciable rain has fallen, irrigation must still be resorted to, in order to keep the trees in good growth and not allow any check to the fruit. This is the best month to sow beans or other seeds for ploughing in later as green manure. Sow about 75 lbs. of kaffir beans per acre, so as to cover the whole area with a green covering.

CROPS.

This month is one of the busiest on the farm. All the implements should be examined and put into order, particularly the maize planter, as

a great many of the misses in the maize fields are undoubtedly due to faulty planting. Seeds should be overhauled, and pea nuts intended for seed are best shelled immediately before planting. Planting and sowing will commence with the rains. Among the first crops to be sown are velvet beans (for seed), pea nuts, dhal, sunflowers and maize. Napier's fodder roots may be divided for the first time if the rains will allow.

ENTOMOLOGICAL.

Maize.—The chief enemies during November are cutworms, stalk borer and surface beetles. See "Some Insect Pests of Maize," *Agricultural Journal*, June, 1912. The black chafer is sometimes very injurious on damp soils, but the insect has been imperfectly studied as yet.

Tobacco.—Practically all the enemies of this crop are injurious when it is newly planted out. See "Handbook of Tobacco Culture," published by the Agricultural Department, pp. 71-90.

Potato.—The first brood of the leaf-eating ladybirds commences in November. See "Two Ladybirds injurious to Potato," *Agricultural Journal*, October, 1913. Blue blister beetles are frequently a nuisance on sandy soils, and caterpillars may be troublesome. An arsenical spray will check these pests.

Cabbage, Turnip, etc., suffer chiefly from diamond back moth and webworm, either of which may be injurious. See "Cabbage Webworm," *Agricultural Journal*, February, 1914. Dusting with paris green and lime will check the diamond back moth.

Bean may suffer from aphis, if the weather is dry. Soap wash or tobacco wash will give relief. Stem maggot is rarely serious as early as November.

Citrus Trees may be sprayed with resin wash for scale.

Deciduous Fruits.—Chafer beetles and fruit moths are the chief troubles. See "Chafer Beetles," *Agricultural Journal*, December, 1914. Netting the trees is the only known remedy for the latter.

Fig.—Fig weevil is apt to be troublesome. The infested fruit should be collected and destroyed.

FLOWER GARDEN.

All seeds may now be planted. Annuals for January flowering should be sown, amongst which the following will be found to do excellently in this country :—Balsam, Calliopsis, Centurias, Chrysanthemum, Dianthus, Eschscholtzia, Marigold, Mignonette, Gallardia, Phlox, Poppy, Nasturtium, Nigella, Verbena, and Zinnia. These are all hardy, and may be sown in the open either in beds or in the position desired for flowering. Advantage should be taken of each shower of rain during this month to keep the soil well worked and loose.

FORESTRY.

Any young plants that are still in the beds should be pricked out into tins in the early part of this month. It is really rather late for this work. If the cross-ploughing and harrowing was not tackled last month, it should be done now.

POULTRY.

Do not allow young stock which has not reached the perching stage to sleep on damp litter. If there is any chance of rain driving into the house at night, some protection must be fixed up. Do not rely upon the rain to fill the water troughs. These should receive the same attention as during

the dry season. Care must be taken that there is no waste of food, as, with the advent of rains, all the stock will pick up an abundance of natural food. A smaller quantity of green food may now be given, but it should not be omitted altogether.

STOCK.

Cattle.—Normally rains will have fallen and the veld will be plentiful now. Beyond careful dipping, ranchers should not have much worry. If the season is bad, the poorer cattle should be drafted out and given a little hay, ensilage or mealies daily. Dairymen will not require to feed much succulent food, and usually the more expensive protein foods may be considerably curtailed at this time, but good sweet hay and mealies will be found to be very beneficial to milch cows, even if the veld is very plentiful. Clean dry sleeping places for both cows and calves will pay handsomely for any extra trouble involved. Young calves do not need to walk far, and in wet weather are much best in a clean dry pen. Watch for ticks.

Sheep.—Keep the sheep on high dry land. Be careful to keep the ticks down. Be sure the kraal or sheep shed is dry and clean, and that there is shelter from the rain for young lambs.

TOBACCO.

Continue to sow seed beds, watering, etc. When early beds become overgrown and hard, pull out, dig up and re-sow. Begin transplanting with the first good rains, and continue as fast as the rains and planters will allow, until the crop is set out.

Be careful to fill in the misses from previous transplanting before starting on new fields; use the stoutest and best plants for filling in, and try to get the tobacco from any one field to grow and come to maturity as near at the same time as possible. Discontinue filling in when the field has been planted for several weeks, and has made a good start to grow, as the later filled in plants will be choked out by the earlier ones, and will not come to maturity.

VEGETABLE GARDEN.

All vegetable seeds may be sown during this month. Tomatoes and early peas and beans should be staked. The soil should be kept loose and free from weeds, which now get troublesome. Sow pumpkin, mealies, peas, and potatoes.

VETERINARY.

Early heavy rains might bring on horse-sickness before its usual time, but as a rule it need not be feared till the first rains are over in December.

WEATHER.

The rains should be commencing, if not already begun; occasionally they have delayed until December, and even later, before setting in properly. Between spells of wet weather lasting several days, fine dry periods occur, at first clear, but later cloudy and thundery, gradually gathering to burst in thunder storms. The mornings are generally fine, and rain falls chiefly in the afternoon or evening. Heavy downpours are to be expected, and should be provided against beforehand by means of ditches and embankments, and by clearing water ways and furrows.

In an ordinary season the rainfall is from four to five inches, more in the east and less in the west and in our two great river valleys of the Zambesi and Limpopo. Before the rains commence, severe heat, trying on account of the strong winds and the dryness of the air, is likely to be experienced.

Weather Bureau.

EVAPORATION, CLEVELAND RESERVOIR, SALISBURY.

Year.	Month.	Monthly Evaporation. Inches.	Daily Maximum. Inches.	Daily Minimum. Inches.	Daily Mean. Inches.
1916	July ...	6·11	0·24	0·16	0·19
1916	August ...	6·91	0·32	0·13	0·22

TEMPERATURES.

Station	July		August	
	Mean Max.	Mean Min.	Mean Max.	Mean Min.
Mashonaland—				
Charter—				
Enkeldoorn	72·29	40·35	73·96	43·51
Hartley—				
Gatooma	79·09	43·39	80·93	46·45
Hallingbury Farm	76·19	40·40	77·96	44·03
Hartley Hospital	77·92	40·4	80·69	44·63
Idaho Farm	77·37	37 5	79·90	42·11
Lomagundi—				
Eldorado Mine	75·13	40·18	—	—
Kanyemba	85·12	57·22	88·45	59·77
Sinoia	80·35	54·61	82·67	61·61
Sipolilo	73·09	43·54	78·58	48·0
Makoni—				
York Farm	—	—	—	—
Mangwendi—				
Kwenda Hospital	69·20	51·19	71·46	53·15
Mazoe—				
Shamva Mine	74·99	44·58	80·08	48·92
Melsetter—				
Melsetter	69·5	44·3	68·91	46·92
Mount Selinda	67·82	46·50	71·01	46·09
Vermont	72·89	48·56	75·97	49·84
Salisbury—				
Chishawasha	72·84	40·1	76·7	42·7
Salisbury (Gaol)	73·3	40·2	76·3	43·4
Umtali—				
Chiconga's Location ...	71·62	44·26	73·69	47·12
Public School	74·80	47·33	76·24	48·22
Summerfield	62·16	—	—	—
Victoria—				
Eythorne	68·33	38·27	71·12	41·53
Morgenster	68·44	47·55	—	—
Victoria	72·83	38·64	74·29	42·25

TEMPERATURES—*(Continued).*

Station	July		August	
	Mean Max.	Mean Min.	Mean Max.	Mean Min.
MATABELELAND—				
Bulalima—				
Plumtree School	71·71	49·68	75·5	47·0
Tegwani	—	—	83·45	—
Bulawayo—				
Essexvale	77·48	37·90	78·6	39·8
Holly's Hope	75·75	40·91	78·13	42·67
Hope Fountain	—	—	—	—
Observatory	—	—	—	—
Rhodes Matopo Park ...	77·7	47·1	81·16	46·32
Gwanda—				
Antelope Mine	75·67	49·0	—	—
Gwelo—				
Gwelo (Gaol)	73·18	34·18	75·79	36·8
Hagley (Iron Mine Hill) ...	72·98	39·13	—	—
Mangwe—				
Empandeni	76·54	41·78	79·0	42·3
Garth	77·14	41·44	78·58	42·78
Tuli—				
Mazunga	78·4	45·1	82·2	48·6
Tuli	79·29	43·54	82·90	45·03
Wankie—				
Victoria Falls	79·03	27·87	83·58	32·48
Wankie (Hospital)	84·83	51·12	88·91	56·03

RAINFALL.

Station	July	August
MASHONALAND—		
Charter—		
Buhera	—	—
Bushy Park	—	Nil
Central Estates	—	—
Driefontein	Nil	Nil
Enkeldoorn	,,	,,
Induna Farm	,,	—
Marshbrook	,,	Nil
Range	,,	—
Riversdale	,,	—
Spitzkop	—	—
Umniati	Nil	0·01
Umvuma (Railway)	,,	—
Vrede	—	—
Wylde Grove	Nil	Nil
Chilimanzi—		
Orton's Drift	—	—

RAINFALL—*(Continued).*

Station	July	August
MASHONALAND—(Continued)		
Hartley—		
Ardgowan	Nil	—
Auchter Leny	—	—
Battlefields (Railway)	Nil	—
Carnock Farm	,,	Nil
Clifton Farm	—	—
Elephant Hill, Battlefields	Nil	0·07
Elvington	,,	—
Gadzema (Railway)	,,	Nil
Gatooma	,,	0·13
Gatooma (Railway)	,,	0·15
Gowerlands	,,	Nil
Hallingbury Farm	,,	0·01
Hartley Hospital	,,	0·02
Hartley (Railway)	,,	0·10
Hopewell	—	—
Idaho Farm	Nil	—
"Jenkinstown"	,,	Nil
Makwiro (Railway)	,,	—
Philiphaugh	,,	Nil
Shagari	,,	,,
"Stoneygate"	,,	—
Lomagundi—		
Argyle	,,	Nil
Banket Junction (Railway)	,,	—
Darwendale	,,	0·06
Duxbury Farm	,,	0·10
Eldorado (Railway)	,,	Nil
Eldorado Mine	,,	—
Golden Kopje Mine	,,	—
Kanyemba	,,	0·15
Lion's Den	—	—
Lone Cow Estate	Nil	—
Longmead	,,	0·01
Palm Tree Farm	,,	Nil
Sinoia	,,	,,
Sinoia (Railway)	—	—
Sipolilo	Nil	Nil
Umvukwe Ranche	,,	0·02
Makoni—		
Chimbi Source	,,	Nil
Eagle's Nest	,,	0·02
Ellavale	,,	—
Farm Carlow	—	—
Gorubi Springs	—	0·14
Inyanga	Nil	—
Mona	,,	Nil
Makaha	,,	,,
Monte Cassino Mission	,,	,,
Odzi (Railway)	,,	0·38
Rusape (Railway)	,,	,,
Springs	,,	—
St. Trias' Hill	0·07	0·03
York Farm	—	—

RAINFALL—(*Continued*).

Station	July	August
MASHONALAND—(Continued)		
Mangwendi—		
Bonongwe...	Nil	Nil
Glen Somerset	,,	0·05
Huish Estate	,,	Nil
Kwenda Mission	,,	0·06
Land Settlement Farm	,,	Nil
Macheke (Railway)	,,	—
Marandellas	,,	—
Marandellas (Railway)	,,	—
Mtoko	—	—
Mrewa	—	—
Nelson	Nil	0·02
Selous Nek	,,	0·12
Theydon	,,	Nil
Tweedjan	,,	,,
Verdoy	,,	,,
Mazoe—		
Avonduur	—	—
Bindura	Nil	—
Bindura (Railway)	,,	—
Ceres	,,	0·10
Chipoli	,,	Nil
Citrus Estate	—	—
Dunmaglas	—	—
Jumbo (Railway)	Nil	—
Kilmuir	,,	—
Laguaha	,,	—
Lowdale	—	—
Mazoe	—	—
Mguta Valley	Nil	Nil
Mount Darwin	,,	0·02
Omeath	,,	0·04
Protea Farm	,,	0·50
Ruia	,,	—
Ruoko Ranche	,,	0·06
Shamva	—	—
,, Mine	Nil	Nil
Stanley Kop	,,	0·40
Sunnyside	—	—
Teign	Nil	0·38
Volynia Ranche	,,	0·58
Melsetter—		
Brackenburg	Nil	0·85
Chikore	0·13	0·15
Chipinga	—	—
Helvetia	0·38	0·16
Melsetter	0·26	1·18
Mount Selinda	0·60	0·37
Mutambara Mission		
Pasture	—	
Tom's Hope	0·69	0·80
Vermont	0·74	1·15

RAINFALL *(Continued).*

Station	July	August
MASHONALAND—(Continued)		
Salisbury—		
Ardbennie	Nil	Nil
Avondale	,,	,,
Botanical Experiment Station	,,	,,
Bromley	,,	,,
Brookmead	—	—
Borrowdale	—	—
Chishawasha	Nil	0·06
Cleveland Reservoir	,,	Nil
Forest Nursery	,,	—
Glenara	—	—
Goromonzi	Nil	0·13
Gwebi	,,	0·12
Hillside	,,	Nil
Lilfordia	—	—
Salisbury (Gaol)	Nil	Nil
,, (Railway)	,,	—
Sebastopol	,,	—
Selby	,,	0·08
Stapleford	,,	0·03
The Meadows	,,	0·10
Vamona	,,	0·01
Westridge	,,	Nil
Umtali—		
Chiconga's Location	0·02	0·07
Odzani	0·06	0·45
Penhalonga	—	—
Premier Estate	—	—
Public School	0·16	0·28
Sarum	Nil	0·03
Stralsrund	0·20	0·18
Summerfield	Nil	—
Umtali (Railway)	0·21	—
Utopia	—	—
Urungwe—		
Nassau Estate	Nil	Nil
Victoria—		
Bikita	0·16	0·11
Brucehame	—	Nil
Chibi	Nil	—
Chilimanzi	—	—
Chingombe	0·05	Nil
Chiredzi Ranche, Ndanga	—	—
Clipsham	—	—
Eagle's Nest Ranche	—	—
Empress Mine	—	—
Eythorne	Nil	0·01
Fairburn	0·04	Nil
Fort Victoria (Railway)	Nil	
Gokomere	,,	Nil
Gutu	,,	
Makorsi River Ranche	,,	Nil
Marah Ranche	..	
Marthadale	0·04	0·07

RAINFALL *(Continued).*

Station	July	August
MASHONALAND—(Continued)		
Victoria—continued		
Morgenster	0·30	—
Ndanga	Nil	0·02
Nuanetsi Ranche	—	—
Pamushana	Nil	—
Silver Oaks	,,	Nil
Tokwe River Ranche...	,,	,,
Victoria	,,	,,
MATABELELAND :		
Belingwe—		
Albany	Nil	—
Anglo-French Block	—	—
Filabusi	—	Nil
Fort Rixon	Nil	—
Infiningwe	,,	Nil
Insiza (Railway)	,,	,,
Orangevale	,,	,,
Roodeheuvel	,,	,,
Scaleby	—	—
Shangani Estates	—	—
Shangani (Railway)	Nil	—
Tamba	,,	Nil
Thornville	,,	—
Wedza	,,	Nil
Bubi—		
Inyati	Nil	Nil
Leighton Farm	—	—
Lochard Experiment Farm	—	—
Bulalima—		
Mholi (late Magot)	Nil	Nil
Plumtree School	,,	,,
The Retreat	,,	,,
Riverbank Farm	,,	,,
Solusi Mission	,,	,,
Syringa	,,	—
Tegwani	—	—
Tjompanie	—	—
Bulawayo—		
Balla Balla (Railway)	Nil	—
Bembesi (Railway)	,,	—
Crombie's	,,	Nil
Edwaleni	—	—
Essexvale	Nil	Nil
Government House	,,	,,
Gwaai (Railway)	,,	..
Heany Junction (Railway)	,,	—
Holly's Hope	,,	Nil
Hope Fountain	—	—
Imbesu Kraal	Nil	Nil
Impondemi	,,	..

RAINFALL *(Continued)*

Station	July	August
MATABELELAND—(Continued)		
Bulawayo—continued		
Keendale	—	—
Khami	—	—
Lower Rangemoor	Nil	Nil
Matopo Mission	,,	,,
Maxim Hill	,,	,,
Melinakanda Junction	—	—
Naseby Farm	Nil	Nil
Nyamandhlovu (Railway)	,,	—
Observatory	—	—
Raylton (Railway)	Nil	—
Rhodes Matopo Park	,,	Nil
Springs Farm	—	—
Umkien	—	—
Umgusa	—	—
Gwanda—		
Antelope Mine	Nil	—
Gwanda (Gaol)	,,	Nil
Gwanda (Railway)	,,	,,
Mtshabzi Mission	,,	,,
West Nicholson (Railway)	,,	—
Gwelo—		
Daisyfield	Nil	—
Dawn	,,	—
Gwelo (Gaol)	,,	Nil
Gwelo (Railway)	,,	—
Globe and Phœnix Mine	,,	Nil
Globe and Phœnix (Railway)	,,	—
Hagley	,,	—
Indiva Farm	—	—
Lalapanzi (Railway)	Nil	—
Lovers' Walk	,,	Nil
Lower Gwelo	,,	—
Oaklands	,,	Nil
Que Que	—	—
Rhodesdale Estate	Nil	Nil
Selukwe (Railway)	,,	,,
Sikombela Farm	,,	,,
Troy	—	—
Woodendhove	—	—
Mafungabusi—		
Gokwe	—	—
Inyoka	—	—
Mangwe—		
Empandeni	Nil	Nil
Garth	..	..
Tuli—		
Lamulas	Nil	Nil
Langalanga	..	..

RAINFALL *(Continued).*

Station	July	August
MATABELELAND—(Continued)		
Tuli—continued		
Makalali	Nil	Nil
Manantji	,,	,,
Mapande	,,	,,
Mazunga	,,	,,
Tuli	,,	,,
Wankie—		
Bombusi	Nil	Nil
Malindi (Railway)	,,	—
Victoria Falls	,,	Nil
Victoria Falls (Railway)*	,,	—
Wankie Hospital	,,	Nil
Wankie (Railway)	,,	—

— No return.

Dates of Meetings of Farmers' Associations, Southern Rhodesia

(SUBJECT TO ALTERATION)

Name of Association	Place of Meeting	Secretary	1916		
			October	November	December
Beatrice Road	Various farmhouses	H. W. Harris	11	8	13
Bembesi	Queen's Mine Hotel	V. C. Andrews	6	3	1
Bindura	Bindura	A. C. Mills	14	..	9
Bromley	Bromley	A. A. Draper	5	2	7
Charter—Mgezi	Beatrice Mine	W. Krienke	25	29	27
Central	Umvuma	— James	28	25	30
Eastern Border (South Melsetter)	Helvetia	J. T. Jollie	13	10	8
Enterprise	Arcturus Hotel	J. Watson	4	1	6
Felixburg	Felixburg	R. H. Brown	28	25	30
Figtree Branch, R.L. and F.A.	Figtree Hotel	W. H. Robertson	7	..	2
Gatooma	Gatooma	T. J. Golding	21	18	16
Gazaland	Chipinga	W. Wood	28	25	30
Greystone	Roodeheuvel Farm, Shangani	J. W. Spencer	14	11	9
Hartley	Hartley	J. de L. Nimmo	7	4	9
Headlands	Headlands	J. M. Harvard	28	..	30
Hunter's Road Farmers and Stockowners	Hunter's Road Siding	R. H. Twilley	14	11	9
Insiza Shangani	Shangani	T. E. Penny	..	..	2
Inyazura	Inyazura	A. C. Curling	18	15	20
Iron Mine Hill Proper	Iron Mine Hill	T. Irving	14	11	9
Lalapanzi and Iron Mine Hill	Lalapanzi and Iron Mine Hill	Cyril Allen	14	11	9
Lomagundi	Sinoia	S. R. Garrard	21	18	16
Macheke	Macheke	W. J. K. Webster	No fixed dates		
Makwiro	Makwiro	T. R. McLellan	20	17	15
Marandellas and Mangwendi	Marandellas Farmers' Hall	A. Nicholson	7	4	2
Makoni	Rusape	H. Barnes Pope	7	4	2
Marula	Marula Siding	Mac. W. Ingram	28	25	23
Mashonaland	Commercial Hotel, Salisbury	J. Reid Rowland	4	1	6
Matopo Branch, R.L. and F.A.	Sibali	——	..	8	..
Mazoe	Glendale Siding	T. J. Mossop	11	8	13
Melsetter (North)	Various farms	Rev. R. Wodehouse	..	..	2
Midlands	Gwelo	P.O. Box 23, Gwelo	14	11	9
Northern Umtali	Farm "Summerfield"	R. O. H. Blurton	..	4	..
Norton and District	Norton Siding	——	7	4	2
Que Que	Que Que	E. J. Ross	21	18	16
Rhodesian Landowners and Farmers	Library Buildings, Bulawayo	H. S. Hopkins	27	24	29
Shamva	Shamva	A. R. Morkel	..	15	
Selukwe	Selukwe	F. S. Clark	No fixed dates		
Somabula and Shangani Flats	Weltevrede School	G. B. Botha	..	11	..
Umvukwe	Various ranches	S. A. S. Colborne	14	11	9
Umtali	Christmas Pass Hotel	J. S. Holland	7	4	2
Victoria	Victoria	John Rennie	6	3	1
Vungu	Vungu	J. H. Erasmus	..	..	..
Western	Plumtree Hotel	A. Barclay	14	11	9

Departmental Notices.

Information for Farmers

The Department of Agriculture is prepared to furnish to farmers technical advice either by correspondence, or, where possible, by personal visits. All communications should be addressed in the first instance to the Director of Agriculture.

Crops

The Agricultural Branch deals with enquiries relating to agricultural practice, soils, crops, cultural operations, processes, seeds, trees, farm implements and machinery, etc.

Disposal of Pure Seed.

Farmers devoting special attention to the production of pure seed of any locally grown crops are invited to communicate with the Government Agriculturist, and at the same time to submit a $\frac{1}{4}$ lb. sample of any seed which they may have for disposal.

In addition to indicating the total amount of seed offered and the price f.o.r. the nearest railway station or siding, the correct name of the variety and the origin of the seed from which the crop was grown should be given. In the case of special attention having been devoted to seed selection, the methods employed should be described.

Where these stipulations are complied with, and the samples forwarded are deemed by the Agriculturist of sufficiently high quality for seed purposes, growers and intending purchasers will be put in touch with one another. It is hoped by this means to encourage the production of pure seed, and growers are urged whenever possible to sell their seed under guarantee of trueness to name, type and sample deposited with the Department.

After placing growers and would-be purchasers in touch with one another, the Department can accept no further responsibility except in the position of adjudicator when bulk supplies are thought inferior to sample and description, in which case both parties will be required to abide by the decision of the Department.

For further particulars see article on Pure Seed Supply, *Rhodesia Agricultural Journal*, February, 1914.

Farm Seeds

The undermentioned seeds grown on the Government Experiment Farms are now available for sale at the prices stated. The prices are f.o.r. Salisbury, or, when available, from the Gwebi Experiment Farm.

All orders for seed must be addressed to the Government Agriculturist, Department of Agriculture, Salisbury.

(1) Seed maize now exhausted.

(2) Japanese buckwheat, 10s. per 100 lbs.

(3) Dhal, 2d. per lb., 15s. per 100 lbs.

(4) Black sunflower seed, 2d. per lb., 15s. per 100 lbs.

(5) Yellow Cross wheat, seed now exhausted.

(6) White flowering linseed, 6d. per lb.

(7) Spanish and Virginia Bunch ground nuts, 20s. per 100 lbs.

(8) German millet and Boer manna, 3d. per lb.

(9) Teff grass seed now exhausted.

(10) Feterita and Texas Red kaffir corn (new introductions), 15s. per 100 lbs.

(11) Kherson's 60-day oats, 24s. per bag of 120 lbs.

(12) Natal Black cow pea, 2d. per lb., 15s. per 100 lbs.

(13) Iron bark pumpkin seed, 2s. per lb.

(14) Majorda melon seed, 1s. per lb.

(15) Velvet bean seeds, 25s. per 100 lbs.

(16) Napier fodder roots, 3s. per 100, £1 per 1,000.

On account of the limited supply of seed available in some cases, it is impossible to guarantee the full delivery of any

order. Farmers are therefore requested not to enclose cheques until they are advised as to the amount of seed allotted to them. The seeds are consigned carriage forward in the case of stations. In the case of sidings the amount of railage should be added. Delivery will commence about the middle of September.

Co-operative Seed Distribution

The following seeds of summer crops are offered f.o.r. Salisbury for trial under the usual terms of co-operative experiments. The experimenter is required at the close of the season to forward to the Agricultural Department, on forms supplied for that purpose, an accurate report of the result of his experiments.

Seed is supplied in sufficient quantity to sow from $\frac{1}{4}$ to 1 acre according to variety, and not more than four varieties can be sent to any one applicant. All applications, together with full particulars regarding forwarding, should be addressed to the Government Agriculturist, Department of Agriculture, Salisbury.

1. *Summer Cereals.*—Burt and Smyrna Oats. (Seed of wheat, rice and New Zealand Oats exhausted.)

2. *Oil Seeds.*—Linseed, Castor Oil, annual and perennial, Sunflower, black Russian, and Ground-nut varieties.

3. *Leguminous Crops.*—Velvet Beans, Dhal and Cow Peas.

4. *Hay Crops.*—German Millet, Boer Manna and Teff Grass.

5. *Root Crops.*—Mangel, Carrots and Cattle Radish.

6. *Fibre Crops.*—Hemp, Jute, Mauritius Hemp, Ramie and Sunn Hemp.

7. *Miscellaneous Crops.*—Japanese Buckwheat, Majorda Melon, Rape and Cattle Kale.

8. *Pasture Plants and Grasses.*—Napier's Fodder slips, Paspalum, Sheep's Burnet and Beggar Weed (legume).

Forestry—Sale of Trees

The undermentioned varieties of trees will be available for sale from December onwards.

Price, f.o.r. Salisbury, 1d. each, 8s. 4d. per 100.

The following reductions are made on large orders on condition that the tins are returned. Otherwise they will be charged up at 3d. per tin:—

£3 per 1,000. £2 10s. per 1,000 for orders of over 5,000.
Average height of trees—3 to 9 inches.
Average number in tin—25.
Average weight of tin—25 lbs.

Belhambra.
Callitris calcarata—Cypress pine.
do. robusta—Murray pine.
Casuarina leptoclada—Beefwood.
Cedrela toona—Toona.
Cupressus arizonica.
do. sempervirens, var. pyramidalis—Churchyard cypress.
do. sempervirens, var. horizontalis — Common cypress.
do. torulosa—Himalayan cypress.
Dalbergia sissoo—Sissoo.
Eucalyptus amygdalina—Peppermint gum.
do. botryoides.
do. calophylla—White flowering gum.
do. citriodora—Lemon-scented gum.
do. corynocalyx—Sugar gum.
do. crebra—Ironbark.
do. leucoxylon.
do. longifolia.
do. melliodora—Grey box gum.
do. microtheca—Coolibah gum.
do. paniculata—Ironbark.
do. robusta.
do. rostrata—Red gum.
do. saligna.
do. salmonophloia.
do. maculata.

Eucalyptus siderophloia.
do. sieberiana.
Jacaranda.
Pinus halepensis—Aleppo pine.
do. longifolia—Chir pine.
Tristania conferta.
Thuya orientalis—Arbor vitæ.
Croton sylvaticus.
Weeping willow.
Lagonaria.
Dodonea viscosa.
Grevillea robusta—Silver oak.
Schinus molle—Pepper tree.

Also in stock larger trees at 3d. each; average height of tree, 9 inches to 2 feet 6 inches; average weight of tins, 25 lbs.; number in tin, 4.

Fourcroya gigantea (Mauritius hemp), 1s. per 100.
Agave sisilana (Sisal hemp), 3s. per 100.
Paspalum, 5s. per 1,000 rooted slips.

Shrubs for Sale

Price, f.o.r. Salisbury, 6d. each. There is no guarantee to have any particular variety of shrub in stock, but everything possible will be done to supply the demand. Most of them are planted four in a tin, but there is usually a fair stock of single tins.

Red.	Approx. height of growth.
Holmskioldia	8 ft.
Habrothamnos	5 ft.
Tecoma capensis	6 ft.
Hibiscus, single	8 ft.
do. double	8 ft.
Bottle brush	10 ft.
Russellia	3 ft.
Pomegranate	8 ft.
Bauhinia	8 ft.
Euphorbia jacquiniflora	4 ft.

	Approx. height of growth.
Plumieria (Frangipane)	8 ft.
Salvia	3 ft.
Cape May	3 ft.
Homelia patens	3 ft.
Bougainvillea	
Poinsettia	
do. double red	
Acalypha	

Pink.

Mallow	3 ft.
Lagerstrœmia flosregina	10 ft.
Alamanda	6 ft.
Sensitive plant	1 ft.

Blue.

Iochroma lanceolatum	10 ft.
Duranta	10 ft.
Plumbago	3 ft.
Heliotrope	3 ft.
Buddleia	6 ft.
Brunfelsia eximia—Natal violet	5 ft.
Rhodesian tree violet—Securidaca	15 ft.
do. lobelia	3 ft.
do. lupin	6 ft.
do. wistaria	20 ft.
Rosemary	

White.

Spirea (Cape May)	4 ft.
Duranta	10 ft.
Lantana bush	8 ft.
Althea, single—"Xmas rose"	5 ft.
do. double	5 ft.
Gardenia	4 ft.
Plumbago	3 ft.
Bauhinia (white and mauve)	8 ft.
Philadelphus	6 ft.
Deutzia	5 ft.
Moon flower	6 ft.
Magnolia	14 ft.

	Approx. height of growth.
Plumieria—Frangipane	8 ft.
Tree lupin	6 ft.
Pittosporum undulatum	7 ft.
Lemon-scented verbena	5 ft.
Rhodesian tree violet	15 ft.

Yellow.

Tecoma Smithii	10 ft.
Thevetia nerifolia	6 ft.
Cape jasmine	10 ft.
do. laburnum	10 ft.
Holmskioldia	10 ft.
Buddleia	10 ft.
Alamanda nerifolia	4 ft.
Streptosolon Jamesonii	3 ft.
Abutilon—"Chinese lantern"	8 ft.
do. —variegated leaf	8 ft.
Poinsettia	8 ft.
Cestrum aurantiacum	5 ft.
Hypericum—St. John's Wurt	4 ft.
Ribes	3 ft.
Naudina domestica	4 ft.
Galphinia nitida	4 ft.
Acacia cultriformis	
Broom	

Mauve.

Iochroma	10 ft.
Salvia	2 ft.

Climbers.

Golden shower—Yellow.
Clitoria ternata—mussel shell creeper—Blue.
Potato creeper (Solanum Wenlandii)—Blue.
Phaseolus caracalla—White.
Beaumontia—White.
Jasmine—White.
Podranea—Zimbabwe creeper—Pink.
Dutchman's pipe (Aristolochia sypho).
Jasmine—sweet-scented—White.
do. double—Yellow.
Ivy.

Applications together with remittances and full particulars regarding forwarding should be addressed to the Government Agriculturist and Botanist, Department of Agriculture, Salisbury.

Poisonous Plants

It is of great importance that as soon as possible a study should be made of those plants found in Southern Rhodesia which are poisonous or deleterious to small or large stock. Farmers and others who have known, or suspected poisonous plants on their property, are requested to communicate with the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, at the same time forwarding specimens of the plant, including stem, leaves, flowers, and, where possible, fruit. Any particular regarding the habits of the plant will be welcomed, and in return the Department will supply all available information regarding the plants.

Live Stock

The Animal Industry Branch is prepared to advise with regard to all matters connected with stock breeding, selection, feeding and registration of stud animals, the dairy industry, poultry management, farm buildings for stock, and kindred subjects. Buyers and sellers of stud stock in Rhodesia are also put in touch with one another.

Entomology

The Government Entomologist advises on matters connected with insect pests of live stock, crops, and fruit trees, and also undertakes the inspection of nurseries and of the importation of plants from abroad.

Chemical Analyses

The Government Agricultural Chemist deals with matters relating to the composition of soils, fertilisers, farm produce of vegetable or animal origin; also the investigation of poisons and of articles of potential economic value.

Nominal charges are made, which, while not covering the cost, will help to defray the expense and serve as a proof of good faith. Samples, carriage prepaid, together with full particulars regarding the subject should be addressed to the Agricultural Chemist, Department of Agriculture, Salisbury.

A schedule of charges and directions for taking samples will be furnished on application.

With all analyses, reports will be furnished explanatory of the results and, when possible, advice given as to the nature, properties and value of the material.

No charge will be made for analysis where the material forwarded is considered by the Director of Agriculture and Chemist to be of sufficient general interest.

Citrus Culture

The Government Citrus Adviser advises on all matters connected with the citrus and deciduous fruit industry.

Services of Government Veterinary Surgeons

1. The services of Government Veterinary Surgeons are available to the public, free of charge, for the following purposes only :—

(1) Attending and giving professional advice in connection with the following diseases, viz. :—Anthrax, Contagious abortion, East Coast Fever, Epizootic Lymphangitis, Foot and Mouth Disease, Farcy, Foot-rot, Heartwater, Glanders, Intestinal parasites amongst sheep and goats, Liver Disease, Lungsickness, Osteo Porosis, Malarial Catarrhal Fever (blue tongue), Rabies, Redwater, Rinderpest, Scabies, Sponziekte (quarter evil), Swine Fever, and any other diseases which may in future be scheduled in terms of section 3, sub-section 18 of the "Animals Diseases Consolidation Ordinance, 1906." Attending to cases of disease amongst live stock which, though not of a contagious or infectious character, may be of general public importance.

(2) Applying tests in regard to Glanders, Tuberculosis, or any other disease against the introduction or spread of which tests are applied under regulations.

(3) Inoculations against the following diseases :—

Horsesickness, Lungsickness, Anthrax, Quarter Evil, Redwater, Malarial Catarrhal Fever (blue tongue). A fee to cover the cost of serum and virus will be charged.

2. The following charges shall be made and payable for services rendered by the Government Veterinary Surgeons in other cases, viz. :—

	£	s.	d.
(1) For every professional visit within three miles of his office or residence	0	5	0
(2) For every professional visit beyond such distance	0	10	6
plus an additional charge of 2/6 per hour whilst engaged in such visits or £2/2/0 a day of 24 hours;			
(3) For advice given at the Veterinary Surgeon's office, for each animal, per visit	0	2	6
(4) The following to be charged in addition to visiting fees :—			
a. For every examination as to soundness, each	1	1	0
b. For castration, horses, each	1	1	0
c. For castration, bulls, each	0	5	0
d. For castration, donkeys, each.. ...	0	10	6
e. For parturition cases, mares, each	2	2	0
f. For parturition cases, cows, each..	1	1	0
g. For other operations, according to nature, from 5/- to £2/2/0.			

3. Double the above fees will be payable for services rendered on Sundays, public holidays, and between the hours of 7 p.m. and 7 a.m.

4. Applicants for the services of Government Veterinary Surgeons must at their own cost provide the necessary transport for the conveyance of these officers from, and back to, their residence or nearest railway station.

5. Farmers and owners of stock throughout the country frequently telegraph for a Government Veterinary Surgeon to be sent to attend an animal which has been taken seriously ill. It is rarely possible to comply with these requests at once, as the Veterinary Surgeon may be engaged on duty which he cannot leave, or is at such a distance from where his services are required that he can hardly be expected to arrive in time to be of any service in an urgent case. Hence much valuable time is wasted, the owner of the animal is dissatisfied, and the veterinary staff discredited. To obviate this, in all cases where veterinary advice and assistance are required, the owner should telegraph to "Veteran," Salisbury, with prepaid reply, the nature of the complaint that the animal is suffering from, giving as full and accurate a description of the symptoms as possible. This will enable the Chief Veterinary Surgeon to telegraph advice at once and state whether he is able to arrange for veterinary attendance on the case or not, and save valuable time, which is always of importance in acute cases.

6. The services of Government Veterinary Surgeons will only be available for private work with the consent of such officers, and when such work does not interfere with their official duties, or when the services of a private practitioner are not available.

7. As the arrangement of allowing Government Veterinary Surgeons to attend to private cases is intended purely for the benefit of farmers and stock-owners who may wish to obtain professional advice, no responsibility whatever will be accepted for any loss of stock, etc., which may result from the negligent treatment or advice, or wilful default, of any Government Veterinary Surgeon.

8. All fees collected in terms of these Regulations are payable to the Treasury through the local Receiver of Revenue.

Irrigation

From the Agricultural Engineer assistance may be obtained by farmers for the following :—

1. In the locating of possible irrigation projects.
2. In the preparation of surveys or plans and for irrigation works, including weirs, dams, furrows, pumping

plants, and determining the extent of land which may be brought under irrigation schemes, together with rough estimates of costs.

3. In the supervision of construction and carrying out of projects.
4. In the selection of suitable sites for boring operations.
5. Preparing specifications, etc., regarding pumping plants, windmills, and agricultural machinery.
6. Giving general advice on cognate subjects.

Informal advice of a general character will be given to applicants making enquiry by letter or in person. Any applicant desiring professional assistance likely to occupy more than one day should apply for advice in writing. All applicants should specify clearly the nature of the project on which they seek advice, and should give full particulars as to the distance and direction of their farms from some well-known centre. Applicants will be required to provide suitable means of transport for the officer concerned during the period devoted to work on the spot; to provide any unskilled labour that may be required; and to provide for any other contingent services. Applications should be addressed to the Director of Agriculture, who will endeavour to arrange visits as far as possible in order of application, but with due regard to situation, in order to obviate unnecessary travelling and delay. The services of the Agricultural Engineer are given free, but in cases demanding prolonged individual attention, or repeated supervision, a charge may be made according to circumstances.

Samples

In connection with enquiries, especially with regard to diseases amongst crops, insect pests, soils, grain and the identification of plants, specimens should, wherever possible, be sent, together with full details. It is found that such parcels are often forwarded without any indication of where they are from or why they were sent and it is difficult in such cases to trace the sender. It is, therefore, requested that persons when forwarding samples for examination, indicate clearly their names and address on the package, so as to enable their requirements to be attended to without delay.

The Analysis of Agricultural Products, Soils, Water, etc.

SCALE OF CHARGES.

Arrangements have now been made for the chemical examination of soils, grain, and other produce, oil-seeds, milk, water, fertilisers, etc., on behalf of farmers and others by the Chemist attached to the Department of Agriculture. The charges made, while not covering the cost, will help to defray the expense and serve as a proof of good faith. Samples, carriage prepaid, together with full particulars regarding the subject, should be addressed to the Agricultural Chemist, Department of Agriculture, Salisbury.

Schedule of Charges.

	£	s.	d.
1. Partial analysis of a manure or feeding stuff, for each constituent	0	5	0
2. Complete analysis and valuation of a manure or feeding stuff	1	0	0
3. Analysis of agricultural products, *e.g.*, grain, hay, roots, etc.	1	0	0
4. Analysis of water for agricultural purposes, irrigation or drainage	1	5	0
5. Partial analysis of soil to determine fertility and recommendations as to manurial treatment	2	0	0
6. Complete analysis of a soil	3	0	0
7. Milk—determination of total fat and solids ...	0	5	0
do. do. of fat only	0	2	6
do. complete analysis	0	10	0
8. Cream—determination of fat only	0	2	6
do. complete analysis	0	10	0
9. Analysis of cheese	0	10	0
10. Limestone estimation of percentage of lime	0	5	0
do. complete analysis	1	0	0

Remittances should accompany samples submitted.

No charge will be made where the material forwarded is considered by the Director of Agriculture and Chemist to be of sufficient general interest.

Directions for Taking Samples of Soils.

It is recommended to select four or five spots at least, per acre, taking care that these represent as far as possible the general character of the soil of the field. If the soil of the area to be reported upon presents notable differences, the samples gathered from the different parts must be kept separate.

Having selected a proper spot, pull up the plants growing upon it and remove surface accumulations of decaying leaves, etc., if any. Dig a hole about twelve inches deep and trim one side so as to be smooth and vertical; from the side so prepared remove with the aid of a sharp spade a slice of uniform thickness—about three or four inches—down to a depth of nine inches. Place the slice on a clean board or cloth and mix thoroughly with similar slices obtained in the same way from other parts of the field area. About six pounds of the mixture are then placed in a clean cloth bag or wooden box. Forward with the sample the following particulars:—

Date of collection, exact location, position (hillside, vlei or flat), peculiarities of soil or sub-soil, behaviour in wet and dry seasons, crops borne, previous manurial treatment, and every circumstance in fact which will throw light on its agricultural qualities.

Directions for Taking Samples of Grains, Produce and Feeding Stuffs.

Grains, meal and feeding stuffs and all agricultural produce should be sampled in the same manner as prescribed for fertilisers.

When the feeding stuff is in the state of cake, select not less than three cakes where the quantity does not exceed one ton, not less than five cakes when the quantity does not exceed five tons, and not less than ten cakes when the quantity exceeds five tons.

Break the selected cakes into small pieces, mix them together, and take the sample not less than one pound—from the mixture.

Directions for Taking Samples of Fertilisers.

If delivered in bags, select not less than two bags when the quantity does not exceed one ton, and one additional bag for every additional ton.

In no case need more than ten bags be selected.

Empty the selected bags separately on to a clean wooden or stone floor. Thoroughly mix the contents, and set aside one spadeful from each bag, mix together the separate spadefuls, and from the mixture take about one pound as a sample.

If the fertiliser is in bulk, mix together portions taken from the different parts, and draw the sample from the mixture.

Directions for Taking Samples of Water.

All samples should be sent in glass bottles. Stoneware jars are to be avoided. The bottles should preferably be provided with glass stoppers; if corks are used, they must be new and well washed previously in pure water.

In sampling a stream or tank, before taking the samples rinse out the bottle several times with water, taking care to avoid the introduction of mud or sediment.

Before taking a sample of water from a pipe, allow the water to run through it for a few minutes at full pressure.

In all cases, before the sample is taken, always rinse out the bottle several times with the water to be sampled.

Quantity to be taken: 1 gallon.

Directions for Taking Samples of Milk and Cream for Butter-Fat Determinations.

The bulk from which the sample is to be drawn should be first poured two or three times from one vessel to another, and about half-a-pint forwarded for examination.

If it is impossible to deliver the sample in a fresh condition, introduce into each sample bottle about as much of the following preservatives as can be held upon a threepenny piece:—Borax, boric acid or salicylic acid; stating which preservative has been used.

All bottles used must have been previously cleansed with boiling water.

Charges for Dipping Cattle at Government Dipping Tanks.

A charge of 1d. per head is made in respect of all cattle dipped at Government dipping tanks.

Unweaned calves will be dipped free of charge.

Payment may be made in cash or by means of books of coupons at £1, 10/- and 2/6, which can be obtained from Civil Commissioners, Native Commissioners, or through all Veterinary Surgeons and Cattle Inspectors.

The tanks to which these provisions at present apply are the following :—

Salisbury (3), Bulawayo (3), Inyati, Umtali, Penhalonga, Melsetter, Marandellas, Macheke, Mazoe, Lomagundi, Hartley, Gwelo, Selukwe, Enkeldoorn, Victoria, Gwanda, Gatooma, Que Que, Umvuma, Kimberley Reefs.

Lectures for Farmers

The services of certain of the officers of the Department of Agriculture and the Veterinary Department are available for purposes of delivering lectures on subjects upon which they have special knowledge. As far as practicable, lectures will be accompanied by demonstrations at the time or subsequently in the field. Owing to the many calls on the time of the staff and the exigencies of their duties, alternative dates are desirable in order to avoid disappointment. The following topics are offered as examples of subjects that may be dealt with in this manner, but the suggestion of other themes is invited.

Agriculture.—Maize growing; Maize selection and maintenance of the breeding plot; Points of maize and maize judging, with demonstrations; Utilisation of granite vlei soils; Ground nut culture; Rotation crops for home use and for sale; Veld improvement by winter grasses; Production of foodstuffs for the mines; Ensilage; Fungoid diseases of maize and wheat; Wheat, oats and lucerne under irrigation; The prospects of cotton culture in Southern Rhodesia.

Veterinary Hygiene.—Detection and prevention of disease; The care of live stock.

Live Stock.—Judging of cattle according to breeds, and for beef, milk and draught; feeding and kraaling of live stock; general principles of cattle breeding; management of imported stock; grading up of native or local stock with pure bred bulls.

Dairying.—Home butter-making; building and equipment of a farm dairy; handling and marketing of milk; packing and marketing of butter; construction of cow houses.

Swine Husbandry.—Breeding and feeding of swine; some suggestions for the production of first-class bacon pigs; construction of piggeries at moderate cost.

Chemistry.—The principles of soil fertility; the principles of manuring; the value of lime in agriculture; chemistry of milk and its products (accompanied by demonstrations in milk-testing).

Entomology.—Economic entomology on the farm; the role of insects and their allies in the transmission of disease; scale insects and fruit trees and methods for their control; insect pests and maize; enemies of the potato, insect and fungus; the value and objects of plant import and nursery regulations.

Irrigation.—Methods of applying water to land for irrigation; the measurement of water in connection with irrigation; canal irrigation; storage reservoirs; hints on the selection of sites and on the design of earthen and other dams; irrigation by pumping, with notes on the selection of plants.

Enquiries and invitations should in the first instance be addressed to the Director of Agriculture, Salisbury.

Departmental Bulletins.

The following Bulletins, consisting of reprints of articles which have appeared in this Journal, are available for distribution free of charge to applicants in Southern Rhodesia only:—

AGRICULTURE.

No. 61. Requirements in sending Botanical Specimens to the Department for Identification.
No. 62. Services of Agricultural Engineer.
No. 64. Hints on Irrigation—Small Gravitation Schemes, by W. M. Watt.
No. 81. Possibilities of Export Trade in Oil Seeds, by H. Godfrey Mundy, F.L.S.
No. 90. Reports on Experiments—Experimental Station, Salisbury, 1910-1911, by J. H. Hampton.
No. 94. Second Report on Experiments, by J. H. Hampton.
No. 155. The Manuring of Maize on the Government Experimental Farm, Gwebi, 1912-13.
No. 160. Hints on Irrigation—Pumping Plants, by W. M. Watt, Agricultural Engineer.
No. 177. Notes on the Raising of Seedling Trees, by F. B. Willoughby.
No. 189. The Manuring of Maize on the Government Experiment Farm, Gwebi, by G. N. Blackshaw, B.Sc., F.C.S.
No. 192. A Calendar of Crop Sowings, by H. Godfrey Mundy, F.L.S.
No. 203. Ensilage, by J. A. T. Walters, B.A., and The Feeding of Ensilage to Dairy Cattle in Winter, by R. C. Simmons.
No. 206. Hints on Irrigation: Small Earthen Storage Reservoirs, by W. M. Watt.
No. 212. Citrus Fruits in Rhodesia, by A. G. Turner.
No. 216. Manuring of Maize on Government Experiment Farm, Gwebi, by A. G. Holborow, F.I.C.
No. 218. Useful Measurements of Maize, by J. A. T. Walters, B.A.
No. 220. Reports on Crop Experiments, Gwebi, 1914-15, by E. A. Nobbs, Ph.D., B.Sc.
No. 221. Results of Experiments, Longila, 1914-15, by J. Muirhead.
No. 222. Costs of Farm Operations, Gwebi.
No. 239. Reports on Crop Experiments, Gwebi, 1915-16, by E. A. Nobbs, Ph.D., B.Sc.
No. 240. Manuring of Maize and Fertiliser Experiments at Gwebi, by A. G. Holborow, F.I.C.
No. 300. The Dangers and Prevention of Soil Erosion, by W. M. Watt.
Tree Culture in Southern Rhodesia, by P. B. S. Wrey, A.M.I.C.E.

CROPS.

No. 88. Chicory Growing, by H. Godfrey Mundy, F.L.S.
No. 106. Cultivation and Preparation of Ginger.
No. 126. Turkish Tobacco.

No. 132. Sumatra Tobacco, Hints to Rhodesian Growers, by C. J. Sketchley.

No. 138. **Tobacco Culture (Virginia)—Harvesting and Curing.**

No. 162. Rhodesian Maize: The Principal Types and their Points, by J. A. T. Walters, B.A., Assistant Agriculturist.

No. 170. Production of Pedigree Seed—Maize, by H. Godfrey Mundy, F.L.S.

No. 174. Notes on Hop Growing, by H. Godfrey Mundy, F.L.S.

No. 175. Notes on Lucerne, by H. Godfrey Mundy, F.L.S.

No. 176. The Cultivation of Castor Oil Beans, by H. Godfrey Mundy, F.L.S.

No. 179. Buckwheat, by H. G. Mundy, F.L.S.

No. 181. Sunflower Cultivation, by H. G. Mundy, F.L.S.

No. 188. The Ground-Nut or Monkey Nut, by H. Godfrey Mundy, F.L.S.

No. 193. Oats in Southern Rhodesia, by H. Godfrey Mundy, F.L.S.

No. 194. Rye, by J. A. T. Walters, B.A.

No. 201. Dhal or Pigeon-Pea, by J. A. T. Walters, B.A.

No. 207. Crop Rotation in Southern Rhodesia, by J. A. T. Walters, B.A.

No. 225. Napier Fodder or Elephant Grass, by J. A. T. Walters, B.A.

No. 232. Witch-Weed or Rooi-Bloem, by J. A. T. Walters, B.A.

No. 235. Crops Unsuitable to Southern Rhodesian Conditions, by J. A. T. Walters, B.A.

ENTOMOLOGY AND VEGETABLE PATHOLOGY.

No. 43. Citrus Psylla.

No. 75. Fumigation of Fruit Trees with Hydrocyanic Acid Gas, by R. W. Jack, F.E.S.

No. 139. Termites, or "White Ants," by Rupert W. Jack, F.E.S.

No. 140. Insect Pests of Tobacco in Southern Rhodesia, by R. W. Jack, F.E.S.

No. 142. The Bean Stem Maggot, by R. W. Jack, F.E.S.

No. 147. Root Gallworn, by R. W. Jack, F.E.S.

No. 148. Darkling Beetle Grubs Injurious to Tobacco, by R. W. Jack, F.E.S.

No. 151. Potato Spraying Experiments for the Control of Early Blight, by Rupert W. Jack, F.E.S.

No. 154. Borers in Native Timber—Results of Experiments with Preservatives, by Rupert W. Jack, F.E.S.

No. 158. Two Ladybirds Injurious to Potato Plants, by R. W. Jack, F.E.S.

No. 171. The Cabbage Web-Worm—A Pest of Cabbage and Allied Plants, by R. W. Jack, F.E.S.

No. 172. Diseases of the Potato Tuber and the Selection of Sound Seed, by R. W. Jack, F.E.S.

No. 178. Illustrations of Natural Forest in relation to Tsetse Fly, by R. W. Jack, F.E.S.

No. 187. The Dusty Surface Beetle, by Rupert W. Jack, F.E.S.

No. 197. Chafer Beetles, by R. W. Jack, F.E.S.

No. 204. Some Injurious Caterpillars, by R. W. Jack, F.E.S.

No. 214. Some Household Insects, by R. Lowe Thompson, B.A.

No. 219. More Household Insects, by R. Lowe Thompson, B.A.

No. 228. Rhodesian Citrus Pests, by R. W. Jack, F.E.S.

No. 233. Does it Pay to Spray Potatoes in Southern Rhodesia? by Rupert W. Jack, F.E.S.

VETERINARY.

No. 50. Epizootic Abortion in Cattle, by Ll. E. W. Bevan, M.R.C.V.S.

No. 51. Strangles, by F. D. Ferguson, M.R.C.V.S.

No. 53. Animals Diseases Consolidation Ordinance, 1904.

No. 65. Common Ailments of the Horse, by D. R. Chatterley, M.R.C.V.S.

No. 84. African Coast Fever—Diagnosis of Gland Puncture, by Ll. E. W. Bevan, M.R.C,V.S.

No. 95. Oestrus-ovis in Sheep, by Alec King.

No. 103. Dipping and Tick-Destroying Agents, by Lt.-Col. H. Watkins-Pitchford.

No. 121. Rabies, by Ll. E. W. Bevan, M.R.C.V.S., and T. G. Millington, M.R.C.V.S., D.V.H.

No. 165. Report of Veterinary Conference, Bulawayo, April, 1913.

No. 180. Note on the Treatment of Biliary Fever of the Horse with Trypan Blue, by Ll. E. W. Bevan, M.R.C.V.S.

No. 191. Scab or Scabies in Sheep and Goats, by Rowland Williams, M.R.C.V.S.

No. 195. Some Notes on the Systematic Dipping of Stock, by C. R. Edmonds, Assistant Chief Veterinary Surgeon, and Ll. E. W. Bevan, Government Veterinary Bacteriologist, Southern Rhodesia.

No. 202. Distomatosis or Liver Fluke in Cattle and Sheep, by Rowland Williams, M.R.C.V.S.

No. 215. African Coast Fever, by Ll. E. W. Bevan, M.R C.V.S.

No. 223. A Note on Contagious Abortion, by Ll. E. W. Bevan, Government Veterinary Bacteriologist.

LIVE STOCK.

No. 96. Swine Breeds and Breeding of, by Loudon M. Douglas, F.R.S.E.

No. 101. Hints to Dairy Farmers, by J. C. Jesser Coope, F.C.S., N.D.D.

No. 145. Prospects for Importation of Cattle from Australia, by Eric A. Nobbs, Ph.D., B.Sc.

No. 161. Notes on Cattle Breeding, Part III., by R. C. Simmons.

No. 190. The Principle of the Winter Feeding of Dairy Cattle, by R. C. Simmons.

No. 208. Water in the Diet of Live Stock, by Ll. E. W. Bevan, M.R.C.V.S.

No. 210. The Care and Feeding of Calves in Dairy and Stud Herds, by R. C. Simmons.

No. 211. The Fattening of Pigs on Granite Farms in Mashonaland, by R. C. Simmons.

No. 227. An Experiment in Beef Production, by R. C. Simmons.

No. 229. Breeding and Feeding of Pigs for Bacon Factory Purposes, by R. C. Simmons.

No. 238. Compulsory Dipping, by E. A. Nobbs, Ph.D., B.Sc., and J. M. Sinclair, M.R.C.V.S.

No. 242. Construction of Dipping Tanks (Revised).

MISCELLANEOUS.

No. 93. Formation of Agricultural Credit Associations in Rhodesia, by Loudon M. Douglas, F.R.S.E.

No. 119. Some Notes on Charcoal Burning, by Eric A. Nobbs, Ph.D., B.Sc

No. 129. How to Make Use of the "Fencing Ordinance, 1904," by N. H. Chataway.

No. 134. Plans and Specifications for Flue Curing Tobacco Barns.

No. 144. Rhodesian Tobacco—Prospects of an Australian Market, by Eric A. Nobbs, Ph.D., B.Sc.

No. 152. A School of Agriculture for Southern Rhodesia, by Eric A. Nobbs, Ph.D., B.Sc., Director of Agriculture.

No. 157. Hints on Brickmaking, by G. T. Dyke.

No. 168. Report on the Methods of Growing, Curing and Selling Bright Tobacco in Virginia, U.S.A., by H. Kay Scorror.

No. 183. The Rainy Season in Southern Rhodesia, by the Rev. E. Goetz, S.J.

No. 184 Cream—Its Separation, Handling and Sale to Butter Factories, by R. C. Simmons.

No. 186. Concrete and Reinforced Concrete, by E. Hardcastle, M.I.E.E.

No. 196. Collection of Agricultural Statistics in Southern Rhodesia, by Eric A. Nobbs, Ph.D., B.Sc.

No. 198. Poultry Keeping for the Rhodesian Farmer, by Frank Sheppard.

No. 199. Eucalypts for the Farm, by J. J. Boocock.

No. 205. Home Butter Making, by R. C. Simmons.

No. 209. The Agricultural Returns for 1914, by B. Haslewood, F.S.S.

No. 213. Hydraulic Rams, by W. Martin Watt.

No. 217. Windbreaks and Hedges, by F. B. Willoughby.

No. 224. Statistical Returns of Crops, 1914-15, by E. A. Nobbs, Ph.D., B.Sc., and B. Haslewood, F.S.S.

No. 226. Classification of Clouds.

No. 230. Farm and Live Stock Statistics, 1915, by Eric A. Nobbs, Ph.D., B.Sc., and B. Haslewood, F.S.S.

No. 231. Estimates of Maize and Tobacco Crops, 1915-16, by Eric A. Nobbs, Ph.D., B.Sc., and B. Haslewood, F.S.S.

No. 234. Eucalypts suitable to Southern Rhodesia, and how to Grow them, by F. B. Willoughby.

No. 236. Notes on Propagation by Means of Cuttings in Rhodesia, by F. B. Willoughby.

No. 237. The Analysis of Agricultural Products, Soils, Water, etc.

No. 241. Hints on Cement Concrete, by W. M. Watt.

Malarial Fever: How it is caused and how it may be prevented, by Sir Ronald Ross, F.R.C.S., D.Sc., LL.D., F.R.S., K.C.B., etc.

Malaria: its History, Prevention and Cure, by A. M. Fleming, C.M.G., M.B., F.R.C.S. (Ed.), D.P.H. (Camb.), Medical Director.

Game Law: Summary of.

Terms for Analysis by the Department of Agriculture, of Produce, Soils, Water, etc

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HANDBOOK OF TOBACCO CULTURE for Planters in Southern Rhodesia. Sold by the Department of Agriculture. 2/6.

Employment on Farms.

The Department of Agriculture receives numerous enquiries from persons of varied attainments, age and financial position for openings on farms, as managers, assistants and learners, requiring remuneration on corresponding scales, or willing to give services in return for keep.

In order that work may be found for the above and needs of farmers met, applications are invited from both employers and persons seeking employment. Applications are also invited from artisans, such as masons, bricklayers, carpenters, fencers, well sinkers, concrete workers, and the like who may desire work on farms. In cases where employers have obtained the labour they require, or applicants for employment have found work, it is requested that notification be at once sent to the Department of Agriculture, in order that unnecessary correspondence be avoided.

Replies to the following applications should be addressed to the initials of the advertisers, c/o Director of Agriculture, who will forward the letter to the party referred to.

Note.—The following advertisements will not be repeated unless the advertisers inform us they wish them to be continued:—

SITUATIONS WANTED.

M. B.—Lady, married, four children, husband serving in East Africa, desires situation on farm. Experienced in management of poultry, dairy, garden and orchard work. Family wish to settle in Rhodesia.

G. R.—Wishes management of stock farm; age 30, married, with family. Sound man in all branches of farming, including stock. Address c/o Alexander Reid, P.O. Winburg, O.F.S.

J. L. D.—Position as farm manager, English and Rhodesian experience with pure-bred and commercial stock, also crops, building and implement repairs. Unmarried, good references. Would take salary or salary and commission.

F. R. T.—Farm manager or assistant. Considerable Rhodesian experience on mixed farm. Good recommendations.

F. J. N.—Wishes to take farm on lease as going concern, or a partnership. Lomagundi district preferred.

J. A. B. Farm manager, age 26, married, no children; eight years experience and good knowledge of all classes of farming. References.

W. G. C.—Farm manager, 4½ years' local experience as manager of progressive farm. Well recommended.

Government Notices.

No. 50 of 1912.] [8th February, 1912.

(As amended by Nos. 329 and 383 of 1914.)

AFRICAN COAST FEVER.

Regulations regarding the movement of cattle and the prevention and suppression of disease.

1. UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw Government Notices Nos. 329 of 1910 and 308 of 1911 and make the following provisions in lieu thereof :—

2. The various districts of Southern Rhodesia are hereby declared an area infected with African Coast Fever for the purposes of section 5 (2) of the aforesaid Ordinance, and, save as hereinafter set out, all movement of cattle within the said districts is prohibited until further notice.

General Movement.

3. For the purpose of section 22 (1) of the said Ordinance, the following shall be regarded as places within the boundaries of which the movement of cattle may be allowed without special permission :—

(a) Single farm.

(b) An area occupied by an owner or lessee, under one management, comprising contiguous farms and situated within one cattle transport area. The mere possession by an owner or lessee of grazing rights over a contiguous farm or farms shall not constitute occupation of such farm or farms.

(c) An area the property of one owner.

(d) For grazing purposes, an area within a radius of four miles of native kraals situated on unalienated land or in reserves, save and in so far as such area includes any private land.

The sites of such kraals shall be deemed to be the places where they are situated at the date of promulgation of these regulations.

(e) An area under the management or control of any Municipality, Sanitary Board or Village Management Board.

4. Notwithstanding the provisions of the last preceding section, or of section 9 hereof, the Chief Inspector may, on the outbreak of disease, or for such other cause as may be deemed expedient, direct the isolation or quarantine of cattle on a limited area of the aforesaid places.

5. The movement of cattle from place to place may be permitted under the special permission, in writing, of an Inspector, Sub-Inspector, or other officer or person duly authorised by the Administrator to grant such permission.

6. No permission as aforesaid shall permit the movement of cattle

(a) Without the written consent of the owners, occupiers or managers of occupied land, and in the case of native reserves, of the Native Commissioner of the district over which land or reserve such

cattle will pass, whether along roads or otherwise; provided, however, that refusal to grant such consent shall be in writing, and provided further that if the Controller of Stock or the Chief Inspector shall consider that such consent is withheld without good and sufficient cause he may permit of movement without such consent.

If any such person mentioned above refuse to give consent or to state a reason for refusing to do so in writing, no valid objection shall be deemed to exist and movement may be permitted without such written consent.

(b) Within a veterinary district as defined in the Schedule annexed hereto from one transport area to or through another without the consent of the Cattle Inspector in charge of such area.

(c) From any veterinary district to or through another without the consent of the District Veterinary Surgeon of such district.

Slaughter Cattle.

7. Cattle moved to any centre for slaughter under the provisions of these or any other regulations shall, on arrival, be immediately taken to such quarantine area (if any) as is provided for the purpose and immediately branded with the letters "V.D." on the near hip.

8. Cattle admitted to a quarantine area in terms of the last preceding section shall be slaughtered within twenty-one days of the date of admission, and shall not be permitted to leave the same except for the purpose of being slaughtered at the appointed abattoir, and if found outside such area, except for the said purpose, may be destroyed on the order of the Chief Inspector or Controller of Stock; provided, however, that the Chief Inspector may allow the removal of cattle from such an area under such conditions as he may prescribe.

Transport Cattle.

9. The use of cattle for draught purposes is prohibited except :—

(1) Within the boundaries of the places defined in section 3 (a), (b) and (c) hereof.

(2) Within the boundaries of areas already fixed for the use of cattle for draught purposes in terms of regulations published under Government Notice No. 329 of 1910, or such other areas as may be fixed by the Administrator.

10. Notwithstanding the provisions of section 9, no permit shall authorise the working of cattle

(a) which are not clearly and distinctly branded with the registered brand of the owner;

(b) in any wagon or vehicle which shall not have the owner's name and address legibly and permanently inscribed on the right side thereof.

11. No wagon or other vehicle drawn by oxen shall be moved from one cattle transport area into another without the permission of the Cattle Inspectors concerned, and under such conditions as they may impose.

General Provisions.

12. On the outbreak or suspected outbreak of disease, the Administrator may declare an area of infection around and embracing the place of outbreak or suspected outbreak, and a further area or areas around such area of infection as a guard area, whereupon all movement of cattle into and from place to place within such area or areas shall be immediately suspended, except as hereinafter provided.

A.—*In areas of infection and guard areas:—*

(1) Cattle in transit by rail may be moved through such area.

(2) Cattle from beyond the borders of Southern Rhodesia may be detrained within such area or areas *en route* to destination.

(3) Cattle for *bona fide* farming, dairy and slaughter purposes may be moved into such area or areas by permission of the Chief Inspector and under such conditions as he may impose.

B.—*In guard areas only:—*

Cattle may be moved into and from place to place within such area under the conditions of section 6 hereof.

13. The removal of green forage, hay, fodder, bedding reeds, manure or of such other articles as may be reasonably supposed capable of conveying infection, shall be prohibited from areas of infection, save and except with the special permission of the Administrator.

14. Whenever an area shall have been declared under section 12 hereof, every person within such area, or within such further area as may be specified by Government Notice, owning or in charge of cattle shall, upon the death or slaughter because of disease, suspected disease, or accident, of any such cattle, immediately report such occurrence through the nearest Cattle Inspector, Native Commissioner or Police Officer to the District Veterinary Surgeon.

15. Notwithstanding the provisions of these regulations, it shall be competent for the Chief Inspector of Cattle to authorise and direct the movement of cattle for the purposes of isolating, dipping, quarantine, or any other such objects as may be deemed necessary to prevent or suppress an outbreak of disease.

16. Whenever an area shall have been declared an area of infection or guard area in terms of section 12 hereof, any person who shall allow any cattle to stray or be otherwise removed, except as provided for in these regulations, from any one place within such area to another place, or from a place outside of to a place within such area, shall be guilty of an offence against these regulations.

17. All cattle within the limits of the various commonages and townlands, areas of infection and guard areas as declared under section 12 hereof, or depastured on common grazing ground, shall be dipped or sprayed at least once in every three days, unless the Chief Inspector shall authorise the extension of the time between such dipping or spraying, or the entire suspension of the same.

18. In all areas of infection and guard areas sheep and goats shall be dipped at such periods as may be directed by the Chief Inspector.

19. Whenever the owner, occupier, or manager of a farm shall adopt means of cleansing cattle running thereon, either by spraying, dipping, or by any other method, the Chief Inspector may order any natives or other persons having cattle on the same farm to cleanse such cattle, and the Native Commissioner of the district within which the farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed upon between the said owner, occupier or manager and the said native owners.

20. All permits for the removal of cattle issued under the provisions of the said Ordinance or of any regulations framed thereunder shall specify legibly and clearly on the face thereof the place from and to which such cattle may be removed, the route by which they shall travel, the number and brands of such cattle, the time allowed for the journey, and such other particulars and conditions as it may be deemed expedient to provide.

21. No permit issued for the movement of cattle shall be taken to authorise any trespass in connection with such movement.

22. Notwithstanding the provisions of these regulations, it shall not be lawful for any owner of cattle to allow any such cattle to be on any road, public outspan, commonage, or any property other than that of the owner,

unless they are free from ticks or unless they have been effectively cleansed by dipping, spraying or other process, within fourteen days of being allowed on such road or other place. Any beast having ten or more ticks on it shall not be considered free from ticks.

23. Any person contravening the provisions of these regulations or the conditions set out in permits issued thereunder, shall, where no higher penalty has been by the said Ordinance or any other law provided, be liable in respect of each offence to a fine not exceeding £20, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months.

SCHEDULE "A."

VETERINARY DISTRICTS OF SOUTHERN RHODESIA.

(1) *Salisbury.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

32. Battlefields; 33. Hartley and Gatooma; 34. Gadzema Station; 35. Makwiro Station; 36. Norton Siding; 37. Hunyani Tank; 38. 1645½ Peg B. & M. & R. Railways; 39. Salisbury A.; 40. Salisbury B.; 41. Salisbury C.; 42. Salisbury D.; 43. Arcturus; 44. Bromley; 45. Marandellas North; 46. Marandellas South; 48. Headlands Station; 49. Junction Mazoe and Lomagundi Railways; 50. 23-Mile Peg, Lomagundi Railway; 51. Passaford Station; 52. 35-Mile Peg, Lomagundi Railway; 53. Gwibi Tank Halt; 54. Banket, Lomagundi; 55. Eldorado, Lomagundi; 56. Selby Siding; 57. Mazoe; and 58. Kimberley Reefs.

(2) *Bulawayo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

1. Plumtree; 2. Marula Siding; 3. Figtree; 4. Westacre Junction; 5. Bulawayo Area; 6. Heaney Junction; 7. Bembesi Station; 8. Insiza North; 9. Insiza South; 10. Shangani North; 11. Shangani South; 14. Redbank; 15. Nyamandhlovu Station; 16. Malindi Station; 17. Wankies Area; 18. Matetsi Siding; 19. Matopo Terminus; 20. Sabiwa Siding; 21. Gwanda Station; 22. West Nicholson; 23. Belingwe; 59. Essexvale and Balla Balla Areas; 60. Stanmore Siding Area; 61. Filabusi Area.

(3) *Gwelo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

12. Somabula Siding; 13. Gwelo Station; 24. Selukwe Area; 25. Surprise Area; 26. Indiva Siding; 27. Lalapanzi; 28. Iron Mine Hill Siding; 29. Umvuma Siding; 31. Que Que Station.

(4) *Umtali.*

An area comprising the native districts of Umtali, Melsetter, Makoni and Inyanga.

No. 320 of 1916.] [1st September, 1916.

HIS Honour the Administrator in Council has been pleased, under the powers conferred upon him by the "Animals Diseases Consolidation Ordinance, 1904," to cancel sub-section (2), section 12 A of Government Notice No. 50 of 1912, and to substitute the following in lieu thereof :—

"Cattle from beyond the borders of Southern Rhodesia may be detained within such area or areas for purposes of inoculation or other veterinary treatment, and upon completion of such treatment may be removed therefrom to their destination."

AFRICAN COAST FEVER.

Areas of infection and guard areas declared in terms of Government Notice No. 50 of 1912.

Melsetter Native District.

(a) *Areas of Infection.*

The farms Highlands, Rockwood, Joppa, Clearwater, Nooitgedacht, Randfontein, Avontuur, Enhoek, Ravenswood, Roslyn, Woodstock, Landsdown, Heilrand, Kenilworth, Wolvedraai, Houtberg, Springfield, Quagga's Hoek, Rumble Hills, Groenvlei, Cecilton, Grass Flats, Moosgwe, Lombard's Rust, Diepfontein, Wolverhampton, Johannes' Rust, Helvetia, Ostend, Geluk, Morgensen, Jameson and Rocklands.

(b) *Guard Areas.*

That portion of the native district of Melsetter south of the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri and the Nyanyadzi River.

That portion of the native district of Melsetter north of and including the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri and the Nyanyadzi River.

Umtali Native District.

(a) *Areas of Infection.*

The farms Penkridge and Thabanchu.

(b) *Guard Areas.*

The farms N'Odzi and Nyagari and the Penhalonga Valley.

That portion of the native district of Umtali lying south of the Impodsi River from its junction with the Odzi River to its junction with the Shetora River, thence up the Shetora River to the farm Butler North and including that farm and Banti North.

Gwelo Native District.

(a) *Areas of Infection.*

The farms Riverbend, Sunbury, Cross Roads, Wegdraai and Reserve.

(b) *Guard Areas.*

That portion of the native district of Gwelo lying north of the Gwelo River and the Gwelo-Umvuma Railway, excluding the Gwelo Commonage.

Salisbury and Mazoe Native Districts.

(a) *Areas of Infection.*

1. Epworth, Adelaide and Glenwood farms.
2. Sternblick farm.
3. Bluff Hill farm.
4. Borrowdale Estate, Helenvale, Glen Lorne, Luna, Carrickcreagh and Greystone farms.
5. An area bounded by and including the following farms: Belford Estate, Belford Estate No. 2, Belford Estate North (excluding that portion lying east of the railway), vacant land on which the Jumbo Mine is situated (excluding that portion lying north-east of the fence erected between the farm Whitfield and the railway line), Foyle, Welbeck, 100-acre lots and vacant land, Tjibakwe and Belford Estate No. 3.

(b) *Guard Areas.*

1. An area bounded by and including the following farms: Stamford, Good Hope, Henricksen, Mabelreign and Tynwald.

2. An area bounded by and including the following farms: Naauwplaats, the southern boundary of Belford Estate, Msasa, Great B, Spelonken, Thetford, Balkiza, Willesden, Welston, Teviotdale, Zizalisari Outspan, Avondale, Salisbury Commonage, Hatfield Estate, the eastern boundaries of Glenwood and Adelaide, Ventersburg, Dispute, Donnybrook, Caledonia, Gardiner, Father Hartmann, Chishawasha, The Crag, The Grove, Halstead, Chindamora Reserve, vacant land west of Poorti River, Glenbervie, Maggies dale, Brundret, Spitzkop, Summerdale, Rockwood, Somerset, Southmoor, Howick Estate, Leeuw's Rust, Klein Kopjes, Oude Kraal and Mooi Leegte.

MTOKO, MREWA AND MARANDELLAS NATIVE DISTRICTS.

(a) *Area of Infection.*

An area bounded by a line drawn from the north-western beacon of Showers, along the western boundary of Showers, Gongwe, Magar, northern and western boundaries of Highlands, north-western and south-western boundaries of Allen, western boundary of Holton Estate, western and southern boundaries of Belmont Outspan, north-western boundary of White Gombola, western boundaries of Bonn, Calne, Wilton, northern and southern boundaries of Delta, and southern boundaries of The Cave and Mere; thence up the Macheke River to the south-western beacon of Monte Cassino; thence along the southern and eastern boundaries of Monte Cassino to its most northern beacon; thence in a direct line to the south-western beacon of Changwe Ranch No. 1; thence along the northern boundary of Fairfield Estate to the Nyagadzi River; thence down this river and the Ruenya River to the eastern boundary of this territory; thence along this boundary in a northerly direction to the Mazoe River; thence up that river to its junction with the Shambara River; thence up that river to Manyeu Mountain; thence in a straight line to the eastern beacon of the Msana Reserve; thence up the Inyagui River to the easterly beacon of Middlesex; thence along the northern boundaries of Middlesex, Kent, Suffolk, Sussex and Rupture and the eastern boundary of Argosy to the point first named.

Note.—The above areas were declared under the following Government Notices:—Of 1915, Nos. 247, 283, 394 and 438; of 1916, Nos. 66, 128, 155, 177, 213, 243, 253 and 275.

No. 214 of 1916.] [9th June, 1916.

AFRICAN COAST FEVER.

WHEREAS there has been an outbreak of destructive disease—to wit, African Coast Fever—on the farm Riverbend, in the native district of Gwelo, His Honour the Administrator in Council has been pleased, under the powers vested in him by the "Animals Diseases Amending Ordinance, 1911," to declare the following area to be actively infected with African Coast Fever for the purposes of the said Ordinance.

Description of Area.

An area comprising the following farms:—Main Belt Block farms east of the Long Valley Spruit, Erin, Doon, Krom River, Clearwater, Northfield, Foxton, Harston, Game Park, Riverdale, Long Valley, Bosch Kloof, Barkly, Turffontein, Cross Roads, Wegdraai, Reserve, Shawlands, Roslin, Loads, Riverbend, Sunbury, Garryowen, Ardpatrick, Woodhouse, Adair, Strathfillan, Headwaters, Bendhu, Mnyami, Hillside, Traveller's Rest, Troy, Barton, Ermelo, Lochiel, Umhlali, Mliza, Que Que Reserve and the British South Africa Company's ground between the rivers Que Que and Bembezaan.

No. 215 of 1916.] [9th June, 1916.

AFRICAN COAST FEVER: COMPULSORY DIPPING OF CATTLE.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 7 of the "Animals Diseases Consolidation Ordinance, 1904," to declare that within the area defined below, on and after date of publication hereof, every owner of cattle shall cause same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from operation of this regulation.

Description of Area.

An area comprising the following farms:—Main Belt Block farms east of the Long Valley Spruit, Erin, Doon, Krom River, Clearwater, Northfield, Foxton, Harston, Game Park, Riverdale, Long Valley, Bosch Kloof, Barkly, Turffontein, Cross Roads, Wegdraai, Reserve, Shawlands, Roslin, Loads, Riverbend, Sunbury, Garryowen, Ardpatrick, Woodhouse, Adair, Strathfillan, Headwaters, Bendhu, Mnyami, Hillside, Traveller's Rest, Troy, Barton, Ermelo, Lochiel, Umhlali, Mliza, Que Que Reserve and the British South Africa Company's ground between the rivers Que Que and Bembezaan.

No. 225 of 1916.] [23rd June, 1916.

AFRICAN COAST FEVER.

WHEREAS there has been an outbreak of destructive disease—to wit, African Coast Fever—at Mrewa's Kraal, in the native district of Mrewa, His Honour the Administrator in Council has been pleased, under the powers vested in him by the "Animals Diseases Amending Ordinance, 1911," to declare the following area to be actively infected with African Coast Fever for the purposes of the said Ordinance.

Description of Area.

That portion of the native district of Mrewa lying south of the main Salisbury-Mtoko road.

No. 226 of 1916.] [23rd June, 1916.

AFRICAN COAST FEVER: COMPULSORY DIPPING OF CATTLE.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 7 of the "Animals Diseases Consolidation Ordinance, 1904," to declare that within the area defined below, on and after date of publication hereof, every owner of cattle shall cause same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from operation of this regulation.

Description of Area.

That portion of the native district of Mrewa lying south of the main Salisbury-Mtoko road.

Nos. 381 of 1914 and 200 and 266 of 1916.]

COMPULSORY DIPPING.

UNDER and by virtue of the powers vested in me by section 7 of the "Compulsory Dipping Ordinance, 1914," I hereby declare that the provisions of that Ordinance shall be applied in respect of cattle within the following areas from the date of issue of these Notices, dipping to take place at such intervals as the Chief Veterinary Surgeon shall direct.

The areas under the control of the Municipalities of Salisbury, Bulawayo, Gwelo and Umtali, the Sanitary Boards at Gatooma and Victoria, and the Village Management Boards at Que Que, Melsetter, Penhalonga, Marandellas, Hartley, Enkeldoorn, Avondale, Umvuma, Selukwe, Gwanda, Blinkwater, Plumtree and Rusape.

Further, I do hereby declare that a charge of one penny per head will be made in respect of all cattle dipped at Government dipping tanks, except unweaned calves, for which no charge will be made; and one penny in respect of all horses, mules and donkeys, and ½d. in respect of all sheep.

No. 70 of 1915.] [4th March, 1915.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notice No. 353 of 1913 and declare that within the area defined below, after date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

An area including parts of the native districts of Bulawayo, Umzingwane, Matopo, Bubi and Bulalima-Mangwe, bounded by and including the following farms :—

Lochard Block, Greenlands, Wessels, Allendale B, Oscardale, St. Ninian's, Fincham's, Inyati Reserve, Lortondale, Wynslay Estate, Greville, that portion of unalienated land lying south of a line drawn from the most westerly beacon of Dollar Block and the north-eastern beacon of Killegar, Killegar, Braemar Block, Portive, Robert Block, Induna, Waterfall, Dingaan, Rouxdale, Fundisi, Umkein, Seaborough, Devonby, Helenvale, Slight's, Billar's, Craiglee, Bluebonny, Ireland, Welcome, Paul's Rest, McGeer's Luck, Centenary Mission, Maritzburg, Springvale, Outspan No. 3, Tati Road, De Hoop, Anglesea, Mineral King, World's View, Matopo Block, Brethren in Christ Mission Farm, Absent, the unsurveyed land lying north of a line drawn from the south-east beacon of Absent to the south-west beacon of The Range, The Range, Clark's, Swaithe's, Limerick, Pioneer's Rest, Mayhill, Rietfontein, Bradford, Hamilton, Mayfair, York, Indina, Rathline, Westondale, sub-division A of Fochabers, Fochabers, Kodhwayo, Zimbile and Lochard Outspan.

No. 206 of 1915.] [25th June, 1915.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that within the area defined below, on and after the date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

All surveyed farms in the native district of Melsetter south of the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge and Biriwiri, including the Ingorima Reserves and Mafusi Reserve, and excluding the farms Umzelezwe, Nyagadzi, Mhungura, Pangela, Passage, Mangani, Chengwe, Gumera, Umbugu, Nhori, Elongwe and Mamzwera.

No. 318 of 1915.] [3rd September, 1915.

AFRICAN COAST FEVER. COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that within the area defined below, on and after the date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

That portion of the native district of Melsetter north of and including the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri, and the Nyanyadzi River; and that portion of the native district of Umtali lying south of the Impodsi River from its junction with the Odzi River to its junction with the Shetora River, thence up the Shetora River to the farm Butler North and including that farm and Banti North.

No. 355 of 1915.] [1st October, 1915.

COMPULSORY DIPPING OF CATTLE.

UNDER and by virtue of the powers vested in me by section 7 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notice No. 527 of 1914, and declare that within the area defined below, on and after date of publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip at intervals not exceeding seven days, unless the Chief Inspector of Stock shall for good and sufficient reasons in any particular case extend or enlarge the said interval or exempt any owner from the operation of this regulation.

Description of Area.

An area in the Salisbury and Mazoe native districts bounded by and including the following farms :—Lilfordia, Saffron Waldon, Kilworth, Porta, Reserve, Clement's Plot, Warwickshire, Oatlands, Amalinda, The Rest, Langford, Saturday Retreat, Reserve, Odar, Stoneridge, Longlands, Seki Native Reserve, Dunstan Estate, Banana Grove, Mayfair, Galway Estate, Sebastopol, Gardiner, Gilnockie, Cromlet, Learig, Reserve, Meadows, Mount Shannon, Halstead, western portion of Chindamora Reserve, Pote, Valeria, Spelonken, Arnold's, Smithfield, Brundret, Spitzkop, Summerdale, Rockwood, Somerset, Southmoor, Howick Estate, Leeuw's Rust, Klein Kopjes, Oude Kraal, Mooi Leegte, Reserve, Bitton, Syston, The Lily and Killiemore.

No. 402 of 1915.] [5th November, 1915.

COMPULSORY DIPPING OF CATTLE: ENTERPRISE SECTION OF SALISBURY NATIVE DISTRICT.

UNDER and by virtue of the powers vested in me by section 2 of the "Compulsory Dipping Ordinance, 1914," I do hereby declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

Description of Area.

An area bounded by and including the following farms :—Halstead, Mount Shannon, The Meadows, Ivordale, Ivanhoe, Oribi, Colga, Neptune, Mashona Kop, Mashona Vlei, Vuta, Chinyika, Lonely Park, Grazeley, Guernsey, adjoining vacant ground, Cromlet, Father Hartmann, Chisla-washa, Stuhm, The Springs, The Grove and Umritsur.

No. 423 of 1915.] [19th November, 1915.

COMPULSORY DIPPING OF CATTLE: MELSETTER AND UMTALI DISTRICTS.

UNDER and by virtue of the powers vested in me by section 2 of the "Compulsory Dipping Ordinance, 1914," I do hereby declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

Description of Area.

All surveyed farms and the Ingorima and Mafusi reserves, in the native district of Melsetter, excluding Umzelezwe, Nyagadzi, Mhunguru, Pangela, Passage, Mangani, Chengwe, Gumera, Umbugu, Nhori, Elongwe and Mamzwera; and including the following farms in the native district of Umtali: Tom's Hope West, Steynstroom, Thabanchu, Penkridge, Macandrews, Cronley and Lisnacloon.

No. 21 of 1916.] [21st January, 1916.

COMPULSORY DIPPING OF CATTLE: SALISBURY, MAZOE AND HARTLEY DISTRICTS.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," to declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

Description of Area.

An area bounded by and including the following farms:—St. Mary's, Stoneridge, Odar, Reserve, Saturday Retreat, Chizanza, Suum Cuique, Arbroath, Langford, The Rest, Amalinda, Oatlands, Warwickshire, Clement's Plot, Reserve, Porta, Lyndhurst, Riverside, Herren Hausen, Lilfordia, Killiemore, The Lily, Ballineety, Fairview, Spa, Passaford, Springvale, Mbebi, Umsasa, Great B, Christon Bank, St. Gerera, Willesden Farm, Borrowdale Estate, Luna, Glen Lorne, Gletwyn, Sternblick, Manresa, Caledonia, Sebastopol, Galway Estate, Mayfair, Nalire Reserve, Buena Vista and Seki Reserve.

No. 22 of 1916.] [21st January, 1916.

COMPULSORY DIPPING OF CATTLE: MAKWIRO AREA, HARTLEY DISTRICT.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," to declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

Description of Area.

An area bounded by and including the following farms:—Umfulia, Dorothy Hill, vacant land, Seigneury Reserve, Zimbo Junction, Serui Drift, Strathmore, Scotsdale, Cape Boys' Reserve, Railway Farm No. 22, vacant land between Railway Farm No. 21 and Spencer, Spencer, Railway Farm No. 23, Woodsgift, Railway Farm No. 25, Southwood, Northwood, Niklot, Rothwell Extension, Hunyani Estate, Hunyani Estate No. 2, Stanhope, Cromdale, Garthnor, Serui, Curlewood, Cotswold and vacant land and farms lying within a line from the most easterly beacon of Cotswold to the north-east beacon of Fort Martin, thence to the south-east beacon of Fort Martin and from there due south to the Umfuli River and down that river to the farm Umfulia.

No. 98 of 1916.] [17th March, 1916.

COMPULSORY DIPPING OF CATTLE: MARANDELLAS AND SALISBURY DISTRICTS.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," to declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

Description of Area.

An area bounded by and including the following farms:—Rakodsi, Longlands, Shepparton (portion of Lendy Estate), Progress, Rockery, Shortlands, Rastenburg, Loquat Grove, Cornwall, Norfolk, Middlesex, Kent, Suffolk, Sussex, Rupture, Argosy, Weir, Inandu, Seaton, Rapture, Sunny Fountains, Mangwendi Mission, Retreat and Springvale.

No. 159 of 1916.] [5th May, 1916.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Compulsory Dipping Ordinance, 1914," to amend Government Notice No. 98 of 1916 by substituting the word "fourteen" for "seven" in the last line, and adding after "days" the words "except during the months of June, July and August, when the intervals shall not exceed twenty-eight days."

No. 126 of 1916.] [14th April, 1916.

COMPULSORY DIPPING OF CATTLE: SHAMVA AREA, MAZOE DISTRICT.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," to declare that within the area defined below, on and after the publication hereof, every owner of cattle shall cause the same to be dipped in an approved dip of standard strength at intervals not exceeding seven days.

An area bounded by and including the following farms:—The Carse, Burnleigh, Woodlands, Ceres, Murgwi, Zombi, Chewarika, Maienzi, Maxton, Lone Star Reserve No. 2, Richlands, M. E. D. Reserve, New Brixton, Dillon, Mullingar, Mumwi, Chipoli, Ellerslie, Wolley, Wapley, Lion's Den, and thence from the south-eastern beacon of Lion's Den up the Poorti River to the north-western beacon of The Carse.

No. 208 of 1916.] [2nd June, 1916

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Compulsory Dipping Ordinance, 1914," to amend Government Notice No. 126 of 1916 by adding after "days" in the last line the words "except during the months of May, June, July, August, September and October, when the intervals shall not exceed 14 days."

No. 336 of 1916.] [22nd September, 1916.

COMPULSORY DIPPING OF CATTLE: HEADLANDS AREA, MAKONI DISTRICT.

IN accordance with the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," notice is hereby given that the owners resident in the area described below have by a majority of votes requested His Honour the Administrator to bring compulsory dipping of cattle into operation in the said area, and that he intends to comply with the said request.

Any person desiring to lodge an objection to the bringing into operation of compulsory dipping as aforesaid shall do so on or before the 23rd November, 1916.

Description of Area.

An area bounded by the Nyagadzi River from where it intersects the northern boundary of Fairfield Estate, down this river and the Umvuri to its junction with the Ruenya River; thence in a southerly direction up this river to the north-east beacon of Rathcline; thence along the northern and western boundaries of Rathcline, and western boundary of Bannockburn North, the southern boundaries of Inyati Block and Yorkshire Estate to the most northerly beacon of De Vos; thence southerly and westward along the boundaries so as to include farms De Vos, Lone Kop, Moodiesville, Reserve, Netzewa, Fischerville, Wakefield, Urmston; thence up the Macheke River to the southern beacon of Monte Cassino; thence along the southern and eastern boundaries of that farm and from its most northern beacon in a direct line to the south-western beacon of Changwę Ranche No. 1; thence along the northern boundary of Fairfield Estate to the first-named point.

No. 186 of 1914.] [23rd April, 1914.

IMPORTATION OF CATTLE.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel the regulations published under Government Notice No. 128 of 1914, and make the following provisions in lieu thereof :—

1. The importation of cattle will be permitted from the Cape Province, the Orange Free State and the Transvaal on the following terms and conditions :—

(1) A permit shall be required from the Chief Inspector, which may contain such conditions as shall from time to time appear expedient.

(2) The importation of cattle with more than two permanent central incisor teeth shall not be permitted, except that animals entered in the South African Stud Book or the appendix thereto, with not more than the first and second pairs of permanent incisors, may be imported.

(3) Applications for permission to import shall be in the form "A" attached hereto, and accompanied by a declaration in the annexed form "B."

(4) All importations shall be by rail, and for the purposes of importation, Bulawayo shall be the port of entry.

(5) All cattle imported in terms of these regulations shall, on arrival at Bulawayo, Salisbury or Umtali, be submitted to such examination or tests as the Chief Inspector may direct. If such examina-

tion or tests disclose the existence of any destructive disease, the cattle shall be immediately destroyed and the carcases thereof disposed of in such a manner as a Government Veterinary Surgeon may authorise or require. The Chief Inspector may permit of the age restriction and the tests aforesaid being dispensed with in the case of cattle in transit by rail to any place beyond the borders of Southern Rhodesia.

(6) All expenses or losses incident to quarantine, examination, testing or destruction as aforesaid shall be borne by the owner of the cattle.

2. The importation of cattle from the United Kingdom of Great Britain and Ireland, the United States of America, the Kingdom of the Netherlands and Germany will be permitted under the following terms and conditions :—

(1) Importation shall be through and direct from the ports of Cape Town or Port Elizabeth, and there shall be a consignment note or other satisfactory evidence that cattle so imported have come direct from one of the above-mentioned countries.

(2) The provisions of sub-sections (1), (5) and (6) of section 1 hereof shall apply to importations in terms of this section.

3. Any person introducing cattle in contravention of these Regulations, or failing to comply with any of the conditions attached to permits to import, or furnishing applications, declarations, or other necessary documents known to be false in any material particular, or failing to comply with all lawful directions as to quarantine, examination, testing, destruction or disposal of carcases, shall be liable to a fine not exceeding £20 for each animal in respect of which such offence shall have been committed, and in default of payment to imprisonment with or without hard labour for any period not exceeding six months, unless higher or greater penalties shall have been provided for such offences by the "Animals Diseases Consolidation Ordinance, 1904"; provided, however, that the penalties imposed by these Regulations shall not exempt any cattle from destruction in terms of the aforesaid Ordinance.

ANNEXURE "A."

APPLICATION FOR CATTLE IMPORTATION PERMIT.

1. Applicant's Name and Address.....
2. Number and Class of Cattle to be imported.....
3. Area or Farm and District where Cattle are at present located.....
.....
4. Area or Farm and District to which Cattle are to be moved.....
.....

Applicant's Signature.....

Date.....

Application.....

Permit No.....

ANNEXURE "B."

I, ... residing on the farm ..... in the district of ..... do solemnly and sincerely declare that the ..... (number in writing) animals also enumerated below have been in my possession since birth, and that Lungsickness (Contagious Pleuro-Pneumonia) has not existed amongst any of my cattle, nor on my farm, during the last four years, and that these animals have never been exposed for sale in any public market or stock fair.

Number of Animals ..... Bulls ..... Heifers .....

Breed .....

Seller's Name and Address .....

.....

Purchaser's Name .....

Place in Southern Rhodesia to which animals are being sent

.....

And I make this solemn declaration conscientiously believing the same to be true.

.....

Declared to at ..... on this ..... day of.....
before me,

.....

Resident Magistrate for the District of .....

IMPORTATION OF STOCK FROM THE PROVINCE OF THE CAPE OF GOOD HOPE.

WITH reference to Departmental Notice of 28th February, 1912, it is hereby notified that the said Notice is cancelled, and importation of stock will now be permitted, in terms of Government Notice No. 110 of 1908, from the Province of the Cape of Good Hope, with the exception of the following districts :—

Komgha
East London
Peddie
Victoria East
Kingwilliamstown
Stutterheim
Cathcart
Stockenstroom
Queenstown (Gwatyu Ward only)
Glen Grey
Maclear
Elliot Slang River
Wodehouse
Barkly East

No. 169 of 1916.] [5th May, 1916.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Animals Diseases Consolidation Ordinance, 1904," to permit, under the terms and conditions of sub-sections (1), (5) and (6) of section 1 of Government Notice No. 186 of 1914, the importation from the Cape Province, Transvaal, Orange Free State and Natal of pure-bred cattle originally imported from the United Kingdom of Great Britain and Ireland, the United States of America and the Kingdom of the Netherlands. Every application for permission to import shall be accompanied by a certificate in the form of the annexure attached hereto.

ANNEXURE.

I.....residing on the farm.....in the district of.....in the Union of South Africa, do solemnly and sincerely declare that the.....(number in writing) animals enumerated below have been in my possession for.....and that lung-sickness has not existed amongst any of my cattle during that period; and further, that such animals are not prevented by any regulations or agreement in respect of freight from being exported from the Union.

Description of Animals.

Breed.	Stud Book in which entered.	Sex, Name and Number in Stud Book.	Country of Origin.
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....

And I make this solemn declaration conscientiously believing the same to be true.

.....

Declared to at.....on this.....day of..... 19.....before me,

.....

Resident Magistrate for the district of.....

Names of former owners.....

.....

No. 342 of 1916.] [22nd September, 1916.

HIS Honour the Administrator has been pleased, under the provisions of the "Animals Diseases Consolidation Ordinance, 1904," to make the following regulation regarding the importation of animals from stock sales :—

The provisions of the regulations governing the importation of cattle, published under Government Notice No. 186 of 1914, shall *mutatis mutandis*, and as far as applicable, apply to animals entered in a South African Stud Book or appendix thereto, when purchased or procured at sales approved of by the Chief Inspector of Stock; provided, however, that a permit to import the same shall only be issued on the production of a sworn declaration of the subjoined form.

I, ...residing on the farm..... in the district of.....in the Union of South Africa, do solemnly and sincerely declare that the.....(number in writing) animals enumerated below have been in my possession from .....(date) and that lung-sickness has not existed amongst any of my cattle since that date, and that these animals have been duly registered in the South African Stud Book or the appendix thereto.

DESCRIPTION OF ANIMALS.

Breed.	Sex.	Name and Number in Stud Book.
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

And I make this solemn declaration conscientiously believing the same to be true.

.....

Declared to at.....on this.....day of .....19... before me,

.....

Resident Magistrate for the District of.....

Names of former owners.....

.....

.....

Purchaser's name.....

Place in Southern Rhodesia to which animals are being sent.....

No. 364 of 1914.] [27th August, 1914.

REGULATIONS GOVERNING IMPORTATION OF LIVE STOCK, ETC.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended from time to time, I do hereby cancel the regulations published under Government Notices Nos. 295 and 394 of 1908; 38, 61 and 263 of 1909; and 60 of 1911 and 188 of 1912, 47 of 1913, and so much of any other regulations as may be repugnant to or inconsistent with the subjoined regulations, which are hereby declared to be of full force and effect.

1. The importation of the following animals from the respective countries or districts enumerated is prohibited, owing to the existence or supposed existence of destructive diseases affecting the said animals in the said countries :—

(1) All animals and dogs as defined by the aforesaid Ordinance from—

India,
Mauritius,
Persia,
British Burmah,
Assam,
China and bordering countries, including Korea,
French Indo-China,
Dutch East Indies,
Hong-Kong,
Federal Malay States,
The Philippines,
Zanzibar,

and all other countries where surra is known or suspected to exist.

(2) Pigs from the Union of South Africa, the Bechuanaland Protectorate, the Tati Concession, and other countries in which swine fever exists or is suspected to exist, subject, however, to the exceptions contained in the proviso to this section.

(3) Dogs from the territories of Northern Rhodesia and Portuguese East Africa, subject, however, to the exceptions in the proviso of this section.

(4) Sheep and goats from the districts of Albany, Alexandria, Bathurst, Bedford, East London, Fort Beaufort, Humansdorp, Jansenville, Kingwilliamstown, Komgha, Peddie, Somerset East, Stockenstroom, Uitenhage and Victoria East, in the Cape Province; the districts of Barberton, Lydenburg, Marico, Pretoria, Rustenburg, Waterberg and Zoutpansberg, in the Transvaal; Swaziland, Portuguese East Africa, Northern Rhodesia.

Provided, however—

(a) that the Chief Inspector may at his discretion permit the importation of pigs, sheep and goats from the above-mentioned places on production of a certificate signed by a duly authorised Government Veterinary Officer in the form of Schedule "A" attached hereto;

(b) that the importation of dogs required for scientific purposes only may be permitted from the places mentioned in sub-section (3) hereof, by the Chief Inspector, in writing, subject to such conditions as may be imposed by him;

(c) that dogs, sheep, goats and pigs from countries from which importation is permitted may be introduced *via* the port of Beira, provided that all such animals shall be transferred directly after disembarkation to the railway trucks at Beira, and conveyed thence to Umtali without leaving the said trucks.

2. The areas set out in Schedule "B" hereto are hereby appointed for the depasturing and quarantining of animals for slaughter in connection with the places therein mentioned.

3. The several districts of Southern Rhodesia are hereby declared to be an area infected with scab amongst sheep and goats, and the movement of all sheep and goats from any farm to beyond the limits thereof, or from their usual grazing ground within the limits of any town lands or native reserves to any other place, is prohibited, except under the written permit of an Inspector or Sub-Inspector. Such permit shall set forth the number and description of animals to be moved, the route they shall travel, and the period for which the permit shall be in force. In cases where it may be necessary or desirable, the person to whom such permit is issued may be required to cause the animals referred to therein to be dipped before being moved.

4. The introduction of sheep and goats is prohibited except—

(a) as specially provided for by section 1 hereof;

(b) from places not mentioned in section 1, if accompanied by a certificate in the form set out in Schedule "C" hereof.

5. The owner or person in charge of any horse, mule or donkey entering Southern Rhodesia by rail shall immediately report such arrival to the Veterinary Office at Salisbury, Bulawayo and Umtali respectively, and no such animal shall be detrained at any intermediate station without the written authority of a Government Veterinary Surgeon.

6. The owner or person in charge of any horse, mule or donkey entering Southern Rhodesia by road shall immediately report such arrival at the Police Camp nearest to the place where such entry is made, and the officer in charge of such Police Camp shall immediately report to the Veterinary Department, which shall direct what steps are to be taken to test such animals with mallein, as in the following clause provided.

7. All horses, mules and donkeys, upon entering Southern Rhodesia, shall be tested with mallein, and the owner or person in charge of such animals shall in all respects carry out the lawful directions of the Inspector while such animals are being tested; provided that this regulation shall not apply to animals in transit through Southern Rhodesia which are not detrained *en route*.

8. Horses, mules and donkeys lawfully in this Territory, and required for purposes necessitating frequent crossing of the border, may be allowed to so cross on such terms as to registration, branding, testing and conditions as the Chief Veterinary Surgeon may from time to time deem expedient to prescribe.

9. An Inspector may direct the thorough cleansing and disinfecting of trucks which may be reasonably suspected of being sources of infection of any destructive disease, and may direct the destruction of truck fittings, fodder, excreta, or other matter or thing which may be reasonably calculated to convey such infection.

10. Any persons contravening the provisions of these regulations, or the instructions or directions given in terms of these regulations, shall be liable in respect of each offence to a penalty not exceeding twenty pounds, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months, unless where more or heavier penalties have by the aforesaid Ordinance, or by other regulations framed thereunder, been expressly provided.

SCHEDULE "A."

Certificate.

Issued under provisions of section 1, Government Notice No. 364 of 1914.

This is to certify that the animals enumerated below are, in my opinion, free from any destructive disease, including heartwater; and, to the best of my knowledge and belief, have not been in contact with any infected animals,

nor come from, or through, a locality where any such disease is known to exist or has existed for twelve months from date hereof.

Date....., 19...

Place .....

.....

Signature of
Government Veterinary Surgeon.

Number and general description of animals :

.....Pigs, ...Sheep, ...Goats.

Place from which animals are to be sent :

.....

Owner's name and address :

.....

.....

Place in Southern Rhodesia to which it is desired to send the animals .....

SCHEDULE "B."

Description of areas set apart for depasturing and quarantining of animals for slaughter.

Salisbury.—A fenced piece of land, 400 acres in extent, situated on the Makabusi River below Maggio's plot, within the Salisbury commonage and towards the southern boundary thereof.

Bulawayo.—That piece of fenced land situated on the Bulawayo commonage between the railway line, to the south, and the Solusi road, adjoining and to the south-west of the Government dipping tank, in extent 1,000 acres more or less.

Gwelo.—Starting from a point where the Ingwania road crosses the railway, along this road past the sanitary stables to a point a quarter of a mile west, thence in a line parallel with the railway to the Gwelo River, thence along the river to the commonage beacon No. 11, thence in a straight line to the Shamrock road where it is intersected by the Scout's Spruit, thence along the Shamrock road to where it joins the Main Street extension, thence along this to the railway line, and down this to the starting point.

Umtali.—A piece of fenced land situated on the old Darlington Farm section of the Umtali commonage.

Penhalonga.—A piece of fenced land situated on plot No. 2, Imbeza plots.

Selukwe.—A piece of fenced land, in extent about 300 acres, situated on the farm Sebanga and adjacent to the township of Selukwe.

SCHEDULE "C."

I, ... residing at .....
in the district of... ..... in the.....
Colony, do solemnly and sincerely declare that the animals enumerated below are free from any contagious disease, including scab, and have not been in contact with any infected animals within six months from date hereof, and that, to the best of my knowledge and belief, such animals, in travelling to.....† station, will not come in contact with any animals amongst which scab or any other contagious disease exists.

And I make this solemn declaration conscientiously believing the same to be true.

.....

Declared to at.....on this.....
day of.....before me.

.....
Magistrate, Government Veterinary Surgeon, Scab Inspector, or Police Officer of district from which animals are being sent.

Number and general description of animals being sent.....
Owner's name and address.....
.....
Place in Southern Rhodesia to which animals are being sent.....
† Station within Colony of origin.

ISSUE OF PERMITS FOR THE REMOVAL OF STOCK.

IT is hereby notified for public information that His Honour the Administrator has approved of members of the British South Africa Police issuing permits for the removal of cattle, sheep and goats at the undermentioned stations when no Inspector or Sub-Inspector of Cattle is available :—

Nyamandhlovu.	Mphoeng's.
Gwanda.	Holi.
Plumtree.	Filabusi.
Fort Rixon.	Gwaai.
Belingwe.	Figtree.
Inyati.	Umvuma.
Fort Usher.	Que Que.
Mazunga.	Tuli.
Makwiro.	Sinoia.
Banket Junction.	Buhera.
Makaha.	Beatrice Mine.
Sipolilo.	Wedza.

No. 305 of 1916.] [25th August, 1916.

(As amended by No. 341 of 22nd September, 1916.)

WHEREAS it is necessary to afford facilities for transport with cattle between the Iron Mine Hill, Chilimanzi, Zimutu, Umvuma and Victoria areas as described in Schedule "A" to Government Notice No. 387 of 1914, His Honour the Administrator in Council has been pleased, notwithstanding any regulations to the contrary, to provide that the Chief Inspector may authorise such movement, in writing, subject to such terms and conditions as he may deem fit to impose.

No. 375 of 1912.] [28th November, 1912

IMPORTATION OF POULTRY.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended by the "Animals Diseases Amendment Ordinance, 1910," I do hereby declare and make known that the following regulations shall be in force and effect from date of publication hereof :—

(1) All poultry imported by rail shall be inspected by an Inspector or Sub-Inspector at Plumtree, Bulawayo or Umtali.

(2) Should any consignment of poultry shew symptoms of disease, or should such Inspector or Sub-Inspector have reason to believe that any dis

ease exists in, or that infection is likely to be conveyed by such consignment, he may order the detention and isolation of the whole consignment for such period as he may deem necessary.

(3) The Chief Inspector may order the destruction of all poultry which he has reasonable grounds for believing to be diseased or likely to convey infection.

THE following extract from Live Stock Regulations, printed on page 150 of the South African Railways Official Tariff Book, is published for general guidance :—

Poultry are not accepted by rail unless they are placed in a crate and the following conditions are complied with :—

(1) The size of the crate shall be 3 feet 6 inches by 2 feet 9 inches external floor dimensions; for turkeys and geese the height shall be 30 inches; and for fowls, ducks, and poultry of a like size, the height shall be 20 inches.

(2) Each crate must contain two drinking vessels filled with pure water, such vessels to be not less than five inches in depth, of the unspillable type, one being fixed at opposite corners of the coop.

(3) Each crate shall contain two receptacles for food of a suitable size, filled with suitable food other than whole maize.

(4) The birds must not be over-crowded in the crates, and in no case must there be more than 20 fowls, ducks or other birds of a like size, or ten turkeys or geese

(5) Different species of birds must not be placed in the same coop.

Unless coops, crates, and the like are strong enough to bear ordinary transit handling, the Administration will not accept responsibility for loss.

No. 281 of 1916.] [4th August, 1916.

POUND AT BALLA BALLA.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 5 of "The Pounds and Trespasses Ordinance, 1903," at the request of the Civil Commissioner, Bulawayo, to declare and make known that a pound has been established at Balla Balla, in the magisterial district of Bulawayo, and that the said pound shall be available for the public from date hereof.

SUMMARY OF THE GAME LAWS.

Game is divided into three distinct classes, described as follows :—

(a) Birds and Small Buck.

(b) Bushbuck, Hartebeest, Impala, Lechwe, Pookoo, Roan and Sable Antelope, Sitatunga, Tsessebe, Waterbuck, and Wildebeest.

(c) Royal Game, which includes Eland, Elephant, Giraffe, Gemsbok, Hippopotamus, Inyala, Koodoo, Ostrich, Rhinoceros, Springbuck and Zebra.

The shooting season for Class "A" is as follows :—

In Mashonaland :

Birds from 1st May to 30th September.
Small Buck from 1st May to 31st October.

In Matabeleland :

Birds and Small Buck from 1st May to 31st October.

To shoot in Class "A" a licence costing £1 per annum is required. This entitles holders to hunt in both Provinces during the open season.

Class "B."—The season opens on 1st July and closes on 30th November in both Provinces. The licence fee is £25 for non-residents and £5 for persons having their domicile in Southern Rhodesia. This licence entitles the holder to shoot up to 15 head, which number may be increased to a total of 25 upon payment of a further sum of £15 in the one case and £5 in the other.

Class "C."—The Administrator may, if he is satisfied that the animals are actually required for scientific purposes, grant to the holder of a game licence permission to shoot or capture any of the species included in this Class. Such permit requires a £5 stamp. Applications in writing, together with proof of *bona-fides*, should be addressed to the Director of Agriculture.

Game for Farming Purposes.—Permits may be granted for the capture of Eland, Ostrich, Zebra or other animals for the purposes of breeding or farming. Such permits require a stamp of the value of £1 and remain in force for six months. Application, accompanied by a sworn declaration, should be made through the Director of Agriculture or the Civil Commissioner of the district.

Game Injuring Crops.—The occupier of any cultivated land or any person acting under the authority of such occupier, may at any time destroy game actually doing damage on such land.

Export of Game.—No living Game or the Eggs of any Game Birds may be exported beyond the limits of Southern Rhodesia without a written permit.

Shooting on Private Land.—A licence does not entitle the holder thereof to shoot on private land without the permission of the land-owner.

Farmers Shooting Game on their Farms.—By taking out a special £1 licence, farmers may at any time shoot any game on their land. "Game" does not include any birds, except ostriches.

Open Area.—The shooting or capturing of all classes of game with the exception of ostriches and other birds classified as game is permitted within the following area in the Hartley district until further notice :—

Hartley District.—From the railway bridge on the Umfuli River, thence north-westwards along the Umfuli River to where it joins the Umniati River, thence southwards along the Umniati River to where it joins the Umsweswe River, thence eastwards along the Umsweswe River up to the drift at the Lydia Mine, thence along the old road from Lydia Mine to Etna Mine and to Inez Mine, thence northwards along the road from Inez Mine to Hartley, thence in the direction of the railway bridge to the starting point on the Umfuli River.

The game specified may be shot in this area without a licence.

Protected Area.—All game is strictly preserved in the Urungwe Game Sanctuary as defined below :

An area in the Lomagundi district, bounded as follows : On the north and west by the River Zambesi, starting at the point where the Lozenzi River joins the Zambesi, and following the course of the latter river to its junction with the Sanyati River : on the east by an imaginary line drawn from the junction of the Indurune and the Nyaodsa Rivers to the head-waters of the Lozenzi River, and thence along the course of the Lozenzi River to its junction with the Zambesi River : on the south by an imaginary line drawn due west from the point of junction of the Indurune and Nyaodsa to the Sanyati River, thence along the course of this river to where it enters the Zambesi.

Game in Class "A" may be hunted in the close season until further notice on private land in the Melsetter district by holders of a licence.

"Locust Birds" are strictly protected, *vide* Government Notice No. 390 of 1912.

Elephants on Occupied Farms, Melsetter.—The destruction of Elephants when found on occupied farms on the High Veld in Melsetter District is authorised (*vide* Government Notice No. 284 of 1908).

Trespassing on native reserves, in pursuit of game or otherwise, is prohibited, except with the written permission of the Chief Native Commissioner.

Trypanosomiasis.—Persons in search of game in the southern part of the Sebungwe district are warned of the danger of hunting anywhere west of the Sengwe and Lutope Rivers within the fly area, and especially of proceeding anywhere within the valley of the Busi River.

No. 183 of 1916.] [19th May, 1916.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 4 (2) of the "Game Law Consolidation Ordinance, 1906," to suspend the operations of sections 9, 10 and 12 of the said Ordinance in so far as they relate to the killing, hunting or capture of game in Class "A" in the native districts of Victoria, Ndanga, Gutu and Chibi, for a period of six months from date hereof.

No. 86 of 1916.] [10th March, 1916.

CANCELLATION OF OPEN SHOOTING AREA IN THE LOMAGUNDI DISTRICT.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Game Law Consolidation Ordinance, 1906," to cancel from date hereof Government Notice No. 273 of 1915, which suspended the operations of sections 9, 10 and 12 of the said Ordinance in respect of all game, with the exception of ostriches and other birds classified as game, within a certain area in the Lomagundi district.

No. 87 of 1916.] [10th March, 1916.

CANCELLATION OF OPEN SHOOTING AREA IN THE SEBUNGWE DISTRICT.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Game Law Consolidation Ordinance, 1906," to cancel from date hereof Government Notices Nos. 227 of 1913 and 312 of 1914, which suspended the operations of sections 9, 10 and 12 of the said Ordinance in respect of all game, with the exception of ostriches and other birds classified as game, within a certain area in the Sebungwe district.

No. 202 of 1916.] [2nd June, 1916.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 4 (2) of the "Game Law Consolidation Ordinance, 1906," to suspend the operations of sections 9 and 12 of the said Ordinance, in so far as they relate to the killing, hunting or capture of game in Classes "A" and "B" in the native district of Sebungwe, for a period of eight months from date hereof.

No. 326 of 1916.] [15th September, 1916.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 4 (2) of the "Game Law Consolidation Ordinance,

1906," to suspend the operations of sections 9 and 12 of the said Ordinance, in so far as they relate to the killing, hunting or capture of game in class "A" in the native district of Wankie, for a period of six months from date hereof.

No. 160 of 1916.] [5th May, 1916.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Game Law Consolidation Ordinance, 1906," to declare that the provisions of Government Notice No. 171 of 1915, under which the shooting, hunting or destruction of all game within the limits of the commonage or townlands of Umtali was prohibited up to the 30th April, 1916, shall remain in force for a further period of one year from the 1st May, 1915.

No. 201 of 1916.] [26th May, 1916.

REWARD FOR THE DESTRUCTION OF WILD DOGS.

HIS Honour the Administrator in Council has been pleased to approve payment of a reward of five shillings for each wild dog destroyed whose destruction is reported and the reward claimed in the manner hereunder set forth.

Rewards will be paid to Europeans by any Magistrate or Native Commissioner and to natives by any Native Commissioner within three months of the date upon which the animal is killed, on a solemn declaration in the form hereinunder prescribed.

In proof of destruction, applicants for the reward will be required to produce and surrender the skin of the animal with the tail not severed.

Form of Declaration.

I,....., do solemnly and sincerely declare that I did, on the.....day of....., and not before, destroy.....wild dog(s) in the district of....., within the boundaries of Southern Rhodesia, and that I am entitled to the reward offered by the Government, and I make this solemn declaration conscientiously believing the same to be true.

.....

Signature.

Signed and declared at.....this.....day of .....

Before me,

.....

Magistrate or Justice of the Peace.

No. 249 of 1908.] [27th August, 1908.

PROTECTION OF TREES.

IT is hereby notified for public information that any person who shall cut down for use as fuel, or for any other purposes than *bona-fide* farming, mining or manufacturing purposes, or cause to be so cut down the "Wild Westeria" (native name M'Pakwa or M'poea) tree, will be liable to prosecution for contravention of the provisions of the Forest and Herbage Preservation Act, 1859, and upon conviction to a fine not exceeding £100, or to imprisonment with or without hard labour for a term not exceeding six months, or to such fine and imprisonment, or to such imprisonment without a fine.

No. 163 of 1909.] [29th July, 1909.

ANY person who shall cut down or destroy, or cause to be cut down or destroyed, the "Shuma" or "Mashuma" tree, except under written authority from the Estates Office of the British South Africa Company, and subject to such conditions as may be imposed therein, will be liable to prosecution for contravention of the "Forest and Herbage Act, 1859," and, upon conviction, to a fine not exceeding £100, or to imprisonment, with or without hard labour, for a term not exceeding six months, or to such fine or imprisonment, or to such imprisonment without fine.

No. 325 of 1916.] [15th September, 1916.

NURSERIES ORDINANCE.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Nurseries Ordinance, 1909," to declare that the following regulations shall be in force and effect from the 31st October, 1916.

---

1. Every nurseryman shall, unless specially exempted by the Director of Agriculture or some person authorised by him to act on his behalf, provide and maintain in good order in his nursery, for the disinfecting of plants, an air-tight chamber constructed of brick, concrete or other strong, durable and rigid material. The chamber shall be so constructed as to—

(a) have a hard and dry floor;

(b) have a close fitting door, not less than five feet high and two feet wide and so constructed that it does not warp;

(c) admit of easy, safe and rapid ventilation after poisonous gas has been used therein.

The inner dimensions of the chamber shall not be less than five feet by five feet by five feet, nor without the written permission of the Director of Agriculture or some person authorised by him to act on his behalf shall one of the three chief dimensions be more than twice another.

2. If iron or wood be used for the walls or roof of the chamber, there shall be two layers separated by a layer of heavy building paper, packed earth or such other material as will resist successfully the passage of gas, or the structure shall otherwise be rendered air-tight in a manner approved in writing by an inspector.

An inspector may require a window, second door or other aperture to be made for purposes of ventilation.

3. The nurseryman shall cause to be fumigated in such an air-tight chamber as aforesaid, and in accordance with these regulations, every orange, lemon and other citrus tree and every deciduous fruit tree immediately prior to the removal of the same from the nursery.

4. The fumigation of fruit trees immediately prior to their despatch from a nursery, as required under these regulations, shall be carried out as follows:—

(a) Hydrocyanic acid gas generated in accordance with the directions of an inspector shall be used, and if the fruit trees be deciduous and dormant the quantities of the chemicals used in generating the gas shall be not less than one ounce avoirdupois of commercially pure cyanide of potassium (98 to 100 per cent. grade), or a weight of commercially pure cyanide of sodium

containing an equivalent amount of cyanogen, and one fluid ounce of sulphuric acid of full commercial strength to each one hundred and fifty cubic feet of space enclosed by the walls of the chamber. If the plants be in foliage, not less than the quantities herein stated shall be used to each three hundred cubic feet of space.

(b) The trees shall be so placed that the gas shall have easy access to every portion of their surfaces which grow above ground.

(c) The chamber shall be securely closed as soon as or before the generation of the gas commences, and shall be kept closed for at least forty-five minutes, or, if special instructions be given by an inspector, for at least one hour.

(d) The contents of the generating vessels shall be examined before the plants are disturbed after the fumigation, and if any lumps of cyanide are found to be still intact the process of fumigation shall be repeated with a fresh charge of chemicals.

(e) The nurseryman shall, if required by an inspector, instal and use such a means for ensuring a rapid diffusion of gas in the chamber as is approved by the inspector.

5. Any person neglecting to comply with the provisions of these regulations shall be liable to a fine not exceeding £25.

No. 337 of 1916.] [22nd September, 1916.

WATER ORDINANCE.

HIS Honour the Administrator has been pleased, under the provisions of sub-section (4) of section 16 of the "Water Ordinance, 1913," and in accordance with the recommendations of the water court given at Bulawayo on the 17th August, 1916, to authorise the Rhodesia Railways, Limited, to impound and store storm water at a point on the Khami River on its property, being sub-division "A" of Woolandale Estate and a piece of ground adjoining granted to the proprietor by the British South Africa Company, to appropriate to its own use the water so impounded, to use and supply it for the running and working of railways in all departments, for the running and maintenance of railway workshops, for the general use of persons employed on railway work in any capacity, whether administrative or executive, and for the maintenance, conduct and requirements of any settlement or camp occupied by such persons.

This grant is issued subject to any rights which upper riparian owners may at present possess or have the right to apply for in respect to the upper waters of the Khami River.

It is a condition of this grant that the said company does not impede the normal flow of the Khami River by the said impounding and storage.

It is a further condition of this grant that whenever the storage works of the said company shall be the direct cause of temporary shortage of water to riparian owners immediately below such works by the holding up of the first storm water of any season, then the said company will be required to pass down an amount of such first storm water equivalent to that held up, but such amount need not be in excess of what is necessary to fill the pools as far down as the junction of the Khami and Umgamin Rivers.

No. 339 of 1916.] [22nd September, 1916.

WATER ORDINANCE.

HIS Honour the Administrator has been pleased, under the provisions of sub-section (4) of section 16 of the "Water Ordinance, 1913," and in accordance with the recommendations of the water court given at Bulawayo on the 15th of August, 1916, to authorise the British South Africa Company to impound and store storm and surplus water from the Pongo River for the irrigation of certain of the said Company's land, namely, subdivision "A" of M'bati Tiabets Block and Shangani Reserve, including the right to divert and store storm and surplus water for the irrigation of three hundred acres of land on both banks of the Pongo River on subdivision "A" of M'bati Tiabets Block and Shangani Reserve, and two hundred acres on the left bank of the Shangani River, also on the above properties.

It is a condition of this grant that, although there shall be no restriction as to the amount of water which the said Company may store and use in the interim, it shall not prejudice the holders of upper riparian lands or their successors in title in any rights to water which they may at present possess or be entitled to apply for.

Department of Posts and Telegraphs,

Southern Rhodesia.

Postal Notice No. 12 of 1913.

AGRICULTURAL PARCELS POST.

IT is hereby notified for public information that, on and after the 1st August, 1909, any article produced, and, if manufactured, produced and manufactured within Southern Rhodesia may be transmitted by Agricultural Parcels Post at the reduced rate of threepence per lb. or fraction thereof, up to a limit of eleven lbs. in weight.

The Agricultural Parcels Post is designed to bring the producer into direct communication with the consumer, and is available for the transmission of :—

Biscuits	Dried Meats	Plants
Bread	Eggs	Poultry
Butter	Flour	Seeds
Confectionery	Flowers	Sugar
Cigarettes	Honey	Tobacco
Dried & Bottled Fruits	Jam	Wool Samples

and other articles produced within Southern Rhodesia. It does not extend beyond the borders of Southern Rhodesia.

The senders of articles at the reduced tariff applicable to the Agricultural Parcels Post will be required to sign a declaration that the contents are the *bona fide* produce of Southern Rhodesia.

The limits of size and weight, and the general regulations, are those applicable to the Inland Parcels Post.

G. H. EYRE,
Postmaster General.

General Post Office, Salisbury,
31st March, 1913.

Bulawayo Waterworks Dam.

THE RHODESIA

Agricultural Journal.

Edited by the Director of Agriculture,
assisted by the Staff of the Agricultural Department.

PUBLISHED BI-MONTHLY.

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Editorial.

Correspondence on subjects affecting the farming industry of Southern Rhodesia is invited. Enquiries will be replied to direct, or through the medium of the JOURNAL. *An interchange of ideas and suggestions between farmers will be particularly welcomed. Contributions of a suitable nature for insertion in this* JOURNAL *will be much appreciated. All communications regarding these matters, and advertisements, should be addressed to the Editor, Department of Agriculture, Salisbury.*

THE SOWING SEASON.—The moment is opportune to remind farmers that it is their duty and their privilege to help the Empire in this time of stress by straining every nerve to produce the greatest possible amount of food-stuffs or other necessities of life. All cannot offer themselves for the greatest sacrifice by entering the firing line, but there are many other ways in which even Rhodesian farmers can bear a direct and important share in the struggle. Of these, none is more necessary than the production of food and raw materials. A

period has been reached when it has become imperative for the Home Government to regulate the consumption of food, and we in this outlying portion of the Dominions shall be doing our little best if we each try to add acre to acre of cultivated land and bag to bag of grain. Let us in Rhodesia make it our aim to produce at least a million bags of maize, and increase our cultivation of other crops to the maximum of our resources. Doubts have been voiced as to the possibility of our being able to export any surplus we may produce over the local requirements. The difficulty of obtaining freight is brought forward as a reason for discouraging farmers from raising heavy crops this season, it being suggested that large parts of the crops are likely to be left to rot on their hands. This is not only a counsel of despair, it is a counsel of foolishness. Given a good, normal season, it will be impossible to avoid producing an exportable surplus of maize, and probably other things as well. If that surplus should be only a small one, it may be impossible to offer inducements to attract shipping tonnage to transport it overseas. On the other hand, if we can shew a really substantial amount of grain, the shipping difficulty is much more likely to be overcome. Therefore, even from the lowest and most selfish point of view, it behoves the farmers to spare no effort to make a record for Rhodesia this year, and they may feel that, while serving themselves, they are at the same time serving the cause of the Empire itself.

Ex-Soldiers for the Land.—Several applications have recently been received from young men who have been invalided out of the army and are anxious to come to Rhodesia and obtain situations on farms. Enquiries as to farming prospects have also been received from persons at present serving in the field who are thinking of coming to this country after the war. In each instance their object is to learn local conditions in the first place, and eventually to acquire land and farm for themselves. As a rule, these applicants state that they do not expect a salary at once, but will give their labour in exchange for board, lodging and tuition, and that their injuries are not of such a nature as to debar them from active farm work.

Any farmer who is prepared to take such a pupil should communicate with the Director of Agriculture. Gratitude and the best interests of the country alike justify an effort to meet these enquiries favourably.

Nature Study.—It has been suggested that the publication, through the medium of this *Journal*, of brief and simple notes on various aspects of what is commonly known as "Nature Study" would be greatly appreciated. It is thought that short and bright articles on this subject, perhaps illustrated, would be welcomed by farmers and other rural dwellers, and in particular by teachers in farm schools, and that all such would be glad of assistance towards a clearer understanding of the beauty and wonder of the common things of the veld.

We are very willing to begin a series of such articles in the first *Journal* of the next volume, and we should be glad to receive suggestions and notes from students of nature who are prepared to help us. The scientific officers of the Department are ready to do their share, but the scope and treatment of the subject will be narrow and monotonous if we do not secure outside assistance, and we shall be glad to correspond with workers in any branch of nature study.

Export of Cattle to Union.—The export of slaughter cattle to Johannesburg has been permitted and carried into effect for some months, to the great advantage of the western districts of Rhodesia. We are glad, therefore, to be able to announce that the Pretoria market has now been thrown open in the same way and under the same conditions. In November the Veterinary Department was informed that a quarantine section had been provided at the Pretoria municipal abattoirs, to which cattle might be sent from certain parts of Matabeleland in the same way as to Johannesburg.

Inoculation against Horsesickness.—We are pleased to be able to state that the Veterinary Department has received

a communication from the Director of Veterinary Research in the Union, Dr. Sir A. Theiler, saying that a small amount of material for the inoculation of horses against horsesickness can now be supplied at a moderate charge for trial in Rhodesia. Recent laboratory experience in the Union has given satisfactory results, and experiments are now being conducted there to ascertain if the same results can be secured in a wider field. It will be very interesting to see if Dr. Theiler's method is successful in Rhodesia. Owners of horses who wish to give it a trial should apply to the Chief Veterinary Surgeon, Salisbury, but we should point out that the quantity of material at his disposal is for the present strictly limited.

Rand Show.—The Witwatersrand Agricultural Society announces that the eleventh annual show will be held in Johannesburg from Easter Monday to Saturday (9th to 14th April, 1917), to extend over six days, as last year. This is an agricultural gathering which many Rhodesians desire to attend and are interested to know in advance the precise date.

Ploughing Demonstration.—In November the farmers in Salisbury district had an opportunity of seeing at work a new make of plough, when Messrs. A. F. Philip & Co. gave an exhibition of the Osborne "Holdfast" disc plough on Mr. H. J. Searle's plot, near the Transport Camp, Salisbury. The land was virgin, but in good condition owing to recent rain, and the plough did very good work. A number of farmers, as well as representatives of the Agricultural Department, attended the demonstration. There were several points in the plough which attracted interest. It differs from most implements of this type in that the discs are fixed and cannot be moved on the beams, the changes from narrow to medium or wide cuts being made by the adjustment of special brackets on the axles of the rear and land wheels. We understand this device was fixed in order to meet the conditions of South Africa, where native labour is general and simplicity essential. All the discs are adjusted at once and uniformly without any risk of a mistake. The wheels also are so ad-

justed that they run in a direct line with the draught, and it is never necessary for them to drag sideways, as so often happens with disc ploughs and is so great a strain on wheels and their bearings. We understand that Messrs. A. F. Philip & Co. intend to stock this plough for next season's ploughing. On the same occasion they shewed at work the "Bull Dog" mould-board plough by the same makers. This did good work, and seems a very handy implement. Both these ploughs are of Canadian manufacture.

INDEX TO THE "AGRICULTURAL JOURNAL."—We are distributing with this issue an index to Vol. XII. We regret the delay in publication, which we fear has caused some of our subscribers inconvenience. It will be seen that the index is much more complete and comprehensive than those previously supplied, and we trust our readers will find it serviceable. The index of Vol. XIII. will be published as soon as possible.

Statistical Returns of Crops Grown by Europeans

IN SOUTHERN RHODESIA FOR THE SEASON 1915-16.

By Eric A. Nobbs, Ph.D., B.Sc., Director of Agriculture, and Fred Eyles, F.L.S., Statistician.

The returns of crops grown in Southern Rhodesia during the season 1915-16 have now been collected and compiled, and are presented in detail in the accompanying tabular statement. Several points in connection with the figures deserve emphasis or require explanation.

Gratifying as they are on the whole, in that they shew better results than many had expected, yet naturally they reflect the unfavourable season of last year, and are a melancholy record of the adverse influence of unusual climatic and other conditions. Not only have we suffered from the effects of the war in our effective manhood and by cessation of immigration, but also by the economic disturbance of our supplies, markets and financial relations. In addition, the growth and yield of our crops were prejudicially affected by the extraordinary and sudden cessation of the rains in February at the height of what is normally the wet season, and at a highly critical period in the growth of our crops. This disastrous factor largely accounts for the relatively poor returns, not only of maize, which was reduced to two-thirds of a full crop, but also of kaffir corn, beans, potatoes, tobacco, ground-nuts, sunflower, linseed and the various forage crops.

As has been noticed in previous seasons, unfavourable

conditions, which cause some diminution of crops grown by the European population, lead to a scarcity amounting to famine amongst the natives. Happily this year the natives' shortage could be met entirely out of the small European surplus, but this extra local demand left but little over for export.

The average yields of the season under consideration must on no account be looked upon as truly representative of the productive capacity either of the country as a whole or of individual districts. Every district suffered more or less from drought, and in some the effect was so severe that returns have come in for hundreds of acres the yield from which was absolutely nil. In scores of other cases, crops planted for grain carried practically no seed. These were cut and converted into silage, and thus the column for bags of grain had to be given as "nothing," although the produce of the land may not have been entirely lost. It is obvious that the acre-yields are in this way seriously lowered, and cannot be taken as indicative of the usual, or anywhere near the usual, crop returns.

TOTAL AREA CULTIVATED.

The form of the statistical statement will be seen to differ in several respects from that used the previous year. A desire had been expressed by the farmers that the scope of the returns should be increased to cover additional crops. This was given effect to, as will be seen from the tables and the text of this article, wherein a number of crops not hitherto dealt with are included and discussed.

The first column of the statement shews 202,946 as the total acreage for all crops covered by the returns, including that for crops not of sufficient importance to be given a place elsewhere in the statement, but exclusive of veld hay, for which the land is not broken up and cultivated.

Mazoe still holds the premier place for amount of ground under cultivation with 46,282 acres, but Salisbury is creeping up, and, with 42,332 acres, shews an increase of 7,587 acres, the most substantial absolute progress made by any district.

Other districts shewing increases of over 1,000 acres each are:—Mazoe, 4,758; Gwelo, 3,283; Makoni, 2,725; Matobo, 1,302, and Insiza, 1,085 acres respectively. The highest proportional increases are naturally found in the districts where arable farming has been on a small scale, so that a small absolute increase makes a large relative difference. Thus Matobo springs from 939 to 2,241, an increase of 138.65 per cent.; Inyanga from 286 to 600, an increase of 109.79 per cent.; and Wankie from 1,052 to 1,874 acres, an increase of 78.13 per cent. The abnormal season and the absence of so many farmers on active service explain the small increases and the actual decreases for certain districts.

The grand total of cultivated land, 202,946 acres, shews an increase of 19,543 acres over last year's total of 183,403, equal to 10.65 per cent. Full particulars of the area cultivated in every district during the last two seasons will be found in Table I., from which a general impression can be formed of the current progress of arable farming in different parts of the country.

MAIZE.

The proportion of land under maize was 86.05 per cent. of the whole area cultivated, while the previous season it was 91.06 per cent. This reduction is more apparent than real, and does not indicate that there was any decrease of acreage given to the crop, which actually occupied 4.57 per cent. more land than last year. The relative difference signifies merely that we now have more comprehensive and accurate information as to the land planted to other crops. No feature of our annual statistics is so remarkable as the dominating position held by maize, whether it be regarded from the point of view of acreage, production or value. It has established itself as the main staple of the country, being the money-getting crop for the farmers, providing the bulk of the food for native labourers as well as live stock, and ranking as an exportable commodity in years of good harvest. There is no sign or likelihood that maize will be displaced or even rivalled for a long time by any other crop.

The season was a disappointing one, and did not fulfil its

promise at planting time. If the acre-yield had been the same as the previous season, the area planted in maize by Europeans alone would have given a harvest approaching one million bags, whereas it was actually only a little over two-thirds that amount. The country must be considered fortunate that the production of grain was sufficient to meet local requirements, including the feeding of natives in famine districts, and even leave a small surplus available to send away. If the promise of the coming season should justify the exhaustion of the carry-over stocks, export to other portions of South Africa may be feasible, without endangering the requirements of the mining industry and forcing prices to prohibitive levels before next season's crop is available.

Recent progress has been slow owing to the war, but still a forward movement continues, as the following figures for maize shew:—

Season.	Acres.	Bags.	Average yield.
1913-14	161,268	634,133	3.93
1914-15	167,012	914,926	5.47
1915-16	174,647	680,285	3.88

A comparison between the acre-yields of the two years can have little value, because the season now being dealt with was an extraordinary one. The average acre-yields for the four chief grain districts this season were as follows:—Mazoe, 6.5; Salisbury, 5.1; Lomagundi, 4.3; and Hartley, 2.7 bags. A good deal of the crop was turned into silage, which reduces the apparent yield of the remainder.

In April we published a statement that the maize harvest might be expected to total about 650,000 bags. This estimate has been somewhat exceeded, the return being 680,285 bags, a difference of 4.6 per cent. At the same time the figure for probable consumption within Rhodesia was placed at 575,000 bags. It has been suggested that our estimate of home consumption was too high. We think, however, that it will be found under rather than over the mark. The total was arrived at in the following way:—

Total European crop, 1914-15 ...		914,926 bags.
Exported		352,058 ..
Retained in country		562,868 bags.
Imports	16,739	
Less export of meal, being difference between imports and exports of meal in terms of bags of maize	5,576	
		11,163 ..
		574,031 bags.

Thus the net home consumption and carry-over in a year of good harvest was over 574,000 bags, this amount being actually retained in the country. The only reason advanced in support of the idea that less will be required this year is the fact that the farmers have reserved less grain for home use. As a result of short crops and high prices, it was natural and expected that less grain would be kept by the farmers, in particular for stock feeding. Last year this reserve was 156,228 bags, and this year 130,959 bags, a difference of about 25,000 bags, which is a reduction of the local consumption by that amount. This reduction will, however, be more than counterbalanced by the extensive failure of native crops, which must increase the local demand for European grain in two ways. Firstly, because the natives have not produced enough grain for their own use, and the deficiency will have to be met by purchase from the stock of European-grown grain, a direct increase of local consumption, and, we believe, a large one. Secondly, and probably a still more important factor, last year being a record for maize production by Europeans, and certainly a good one for native production, it follows that some surplus of native-grown grain found its way on to the open market. The amount of native grain thus coming on the market is unknown, but it was probably considerable, and to that extent it decreased the local demand for European-grown grain. Whatever place was filled by native grain last year can only be filled this year from the European crop. Expressed shortly, this year's consumption

of the European crop may be expected to be greater than last year's to the full extent that the open market was supplied from native sources last year, plus the amount the natives will purchase to meet their food necessities, minus the 25,000 bags' reduction of consumption on the farms.

CITRUS ORCHARDS.

The orange and its allies constitute the group next to maize most widely distributed throughout Rhodesia, as almost every farm possesses a few, if only in a garden for home use. In this way citrus trees are being tried all over the country, and, in those districts to which they are most suited, they are already forming a special branch of the farming industry as distinct as that of dairying or tobacco growing, and promising at an early date to surpass these in importance.

Apart from nursery stock, the total number of citrus trees planted out is given as 129,814, covering 1,723 acres, which as nearly as possible agrees with the average planting distance of about 75 trees per acre. Of this area, however, only 561 acres, or about one-third, is irrigated; and it is to the irrigated area particularly that we are taught to look for our commercially successful citrus groves. The districts of Mazoe, Lomagundi, Salisbury, Gwelo, Umtali and Melsetter shew the largest numbers, and seem likely to become the chief centres of the industry in the future.

Shipments exported by the British South Africa Company from the Premier Estate and from their orchards at Sinoia and Marandellas have resulted most satisfactorily, and clearly indicate that there is profit in citrus growing where modern methods are practised.

KAFFIR CORN.

The area planted was 2,655 acres, and the harvest 4,701 bags, or an average yield of 1.77 bags per acre. The sorghums are attracting increasing attention in other countries, notably in the United States and Egypt, where their value is recognised, and it is hoped that farmers will not draw hasty conclusions as to the possibilities of this crop from the scanty figures yet available for Rhodesia, where it can hardly be said

to have had a good trial up to the present. In any case, the average for the country is no indication as to what can be done with kaffir corn in districts well suited to it; for instance, it will be seen that from the 10 acres planted in Lomagundi, 70 bags were reaped. Yielding, as it is known to do, good crops under native treatment, it is likely to give even better results when grown by Europeans. The weather last year largely accounts for the poor return.

SUNFLOWER.

Both the acreage and the output of this seed have been more than quadrupled in one year. The yield per acre for the country was 582 lbs., as against 580 lbs. the previous season. For the three chief producing areas the acre-yields were:—Mazoe, 793 lbs.; Hartley, 728 lbs.; and Salisbury, 530 lbs. Sunflowers seem to be more hardy to drought conditions than most crops, and the crop holds great promise if it can be successfully marketed. Growers, however, would do well to bear in mind that the best prices can only be secured if the product is placed on the home market as early as possible.

GROUND NUTS.

The area under ground-nuts has been nearly doubled, and the output more than doubled. The yield per acre for the country rose from 6.87 bags of 80 lbs. each to 7.36 bags. Salisbury district was again the chief producer with 9,401 bags. When writing last year we referred to the uncertainty as to whether this crop would pay to export overseas, and mentioned that a test shipment was being made by the British South Africa Company to clear up the point. In the last *Journal* we published a statement of account shewing the results of this experiment, which proved that ground nuts, shelled or unshelled, cannot be sent from Rhodesia to the Home market under the conditions now obtaining except at a heavy loss. The best market for our nuts, at any rate until the war is over, will be found in South Africa, and, in the first instance, in the supply of our own local industries for the manufacture of oils and soaps. This season there appears to be no need to study the question of export, for the difference

between the total crop, 22,415 bags, and the amount reserved on the farms is 13,817 bags, all of which can be absorbed by the Salisbury Oil Factory, the mines and other local consumers. A limited amount has also been sent to the Union, and sold, we believe, at satisfactory prices.

BEANS.

We have returns of this very generally grown crop for the first time. It occupied the considerable area of 2,424 acres, and a comparison of the acre-yields of different districts is interesting, shewing, as it does, that districts not usually appearing high in the list for arable farming can and do produce this crop more largely than in the maize belt. The acre-yield for the country is 297 lbs., and for some of the districts as follows:—Melsetter, 654; Inyanga, 628; Nyamandhlovu, 517; Chilimanzi, 496; Salisbury, 412; Makoni, 333; and Mazoe, 261 lbs.

POTATOES.

The figures for potatoes are similar to those of the previous year, though a somewhat smaller production from a slightly larger area is shewn, probably due to unfavourable climatic conditions. The summer-grown harvest totalled 26,290 bags, as against 24,536 bags last year. The winter crop is estimated at 9,555 bags, instead of 13,646 previously. This estimate, however, cannot be considered very reliable, and may differ greatly in either direction from the actual harvest. The total acreage under potatoes in 1914-15 was 1,563, and in 1915-16 1,757.

Potatoes are one of the most widely grown of our crops, yet sufficient is not produced to supply the regular demand for this constantly required foodstuff, and there is a seasonal importation amounting to about 6,000 bags per annum.

TOBACCO.

The acreage under tobacco was even less than last season, though the difference was small. The acre-yield, however, shewed improvement, being 486 lbs., as against 309 lbs. per acre the year before, with the result that the crop reaped

increased from 426,423 lbs. to 637,261 lbs., or an increase of 49.4 per cent. This is a very satisfactory yield considering the season, and if the lessons of the past have been learned, as we believe they have, it may be presumed that the quality of the output will be high, and good prices will be secured. The factors necessary for successful marketing are now better understood, and the system of handling is well organised, so that we may anticipate a steady annual increase in the area under tobacco until this valuable crop again attains the dimensions and importance proper to it in Rhodesia. Tobacco is mainly grown in the granitic areas of Marandellas, which accounts for half the total, in Mrewa, Makoni and Salisbury, and to some extent in Hartley and Lomagundi, but elsewhere very little is found.

WHEAT.

The most noteworthy feature of this crop in 1915-16 is the increase of acreage of wheat as a summer crop, rising from 321 acres the previous season to 866 acres this year, that is, 169.7 per cent. increase. The harvest reaped shews an improvement even more marked, being 2,397 bags, compared with 750 bags before, or 219 per cent. increase. As a set off on the other side, the area under winter wheat fell from 1,364 acres to 1,185, and the estimated crop from 5,489 to 3,559 bags. This was doubtless largely due to the failure of water for irrigation, and the dryness of vleis usually cultivated in winter.

FODDER CROPS.

Forage and Hay.—*Oats.*—The return for oats calls for no special remark, being much the same as the previous year.

Napier's Fodder, Teff Grass and Millets.—These appear in the table for the first time, and acreages only were asked for. Teff grass is the most popular of the three, but the acreage occupied by Napier's fodder is very promising, for as yet it is mainly grown in many small nursery plots, and is giving such excellent results that its rapid extension may confidently be anticipated.

Barley, Rye, Velvet Bean Hay and Lucerne.—These crops have not been given a place in the table, the area

Group of North Devon Bulls undergoing inoculation for Rhodesia, for Messrs. Austin & Good, Mazoe.

North Devon Bulls. Property of Messrs. Austin & Good, Mazoe.

devoted to them being relatively small, as follows:—Barley, 286; rye, 231; velvet bean hay, 269; and lucerne, 455 acres; but it will be of interest and importance to trace the expansion of such more or less experimental crops in time to come.

Roots and Substitutes.—*Sweet Potatoes* occupied 616 acres, and so small a proportion of this crop is sold off the farms that we include it under this head. Only 103 acres of *Mangels* were planted, and neither this nor the preceding crop is of sufficient importance to be placed in the table.

Pumpkins, the old favourite, seems likely to be distanced in the race by the comparatively new introduction *Cattle Melons,* the former being planted on 1,591 acres and the latter on 2,033 acres.

SUNDRY CROPS.

Linseed does not at present occupy an important place in our list of crops. Only 112 acres were devoted to it, and the acre-yield cannot be considered satisfactory. The total yield returned was 13,290 lbs., of which 9,097 lbs. were retained for use on the farms. The acre-yield for the country was 118 lbs., and for the chief producing districts as follows:—Salisbury, 247 lbs.; Hartley, 209 lbs.; and Mazoe, 129 lbs. per acre. Its high price and unique properties in feeding bulls and all specially valuable stock, however, justify its continuance and extension.

Dhal.—This is a crop only now coming into favour, the possibilities of which are hardly yet adequately realised. The grain has proved of high value as a substitute for peas for finishing bacon pigs, and it has also proved very suitable in mixtures for fowl feed. As a green fodder, it is increasingly prized at the worst part of the dry season, but, as with most novelties, stock have to be educated to its use. Last season 485 acres were planted to dhal, and this will probably shew a steady increase from year to year. Early frosts proved prejudicial last season, and it is evident that it must be grown in places protected from this danger, but otherwise it seems hardy, productive and a valuable addition to our fodder crops.

Buckwheat.—This was planted to the extent of 475 acres, and the yield returned was 150,653 lbs., of which 68,243 lbs. were reserved for home use. The variations in acre-yield are remarkable, ranging from 1,050 lbs. in Inyanga to 245 lbs. in Marandellas. For the whole country the yield per acre averaged 317 lbs.

Onions.—Only 44 acres were returned as planted to onions, but the yield per acre is high, and the crop very profitable when well looked after.

VELD HAY.

The figures returned for acres of veld hay cut must be considered only approximately correct, for in many instances this winter feed is mown from irregular shaped areas, often between hills or among trees, and the farmer as a rule does not measure carefully the acreage worked. The substantial total of over 25,000 acres utilised in this way shews the amount of attention now being paid to the question of feeding stock through the winter. It will be interesting to watch this column from year to year and mark the progress made.

SILOS.

The number of silo pits and stacks returned for the whole country is 512, which, taken at an average of 50 tons per pit or stack, gives a total tonnage of 25,600, as compared with 9,858 tons last season. Evidently this most valuable form of insurance against the poor pasturages consequent on droughts is rapidly being adopted by our farmers. It might have been expected that more ensilage would be made in the distinctly pastoral districts as opposed to the richer arable districts, but such is not the case, as it will be seen that Salisbury and Mazoe head the list with 86 and 67, Hartley being third with 50, and Bulalima-Mangwe fourth with 43 pits and stacks.

DISTRICTS.

As regards the various native districts into which, for administrative purposes, the Territory is divided, it may be convenient briefly to review the conditions of each as indicated

by the statistical returns received, taking them in order from west to east.

In Wankie and Bulalima-Mangwe, maize was very poor, and, in frequent cases, proved a complete failure, much being converted into silage. Kaffir corn is comparatively more largely grown in Wankie, Umzingwane and Gwanda than elsewhere.

In Nyamandhlovu, maize, though a light crop, did not suffer nearly as much as in adjoining districts, and a number of fair returns, as well as partial failures, are recorded. Silos are very general, and crops of ground nuts, beans, potatoes, citrus and cattle melons are common, though each on a small scale.

In Bulalima-Mangwe, which ranks sixth in point of number of farmers, cowpeas and teff are frequently mentioned, as well as Napier's fodder, beans, sunflower, cattle melons and hay. Feed for stock in winter is evidently receiving increased attention.

In Matobo and Nyamandhlovu, ground nuts seem to have been comparatively successful, which is the more notable in a year when most other crops have suffered so severely. This points to their drought-resisting power.

Bulawayo and Bubi felt the drought severely, and this is specially shewn by the maize crops, but sunflower seems to have done well, in spite of adverse conditions. Citrus fruits are general on a small scale, and in the aggregate not inconsiderable.

In Insiza, Gwelo and Selukwe some improvement as contrasted with the above districts is noticeable, in spite of the season having been the worst for at least 15 years, though the drought effects are still apparent. Maize was a comparative failure, and was largely converted into silage, though this form of preserving fodder, and even hay-making, seem less prevalent than might be expected. Side crops, many of which are being grown experimentally, are generally sown late, and so caught the full force of the February drought and suffered accordingly.

The result of the drought is more evident in the returns

from Belingwe than anywhere else, and Gwanda too shews very poor returns, but the latter is a district with very little arable farming at any time.

In Victoria, Gutu and Ndanga, maize was very poor, whilst other crops are almost negligible, and silos are few and far between.

In Charter the season was less unfavourable, and a wider variety of crops are grown, including citrus of all kinds, wheat, oats and tobacco, but fodder crops and silos again are very little used.

Chilimanzi gave a better output of maize than Charter last year. Citrus is very generally found. Hay and silos occur, but are still too few, while wheat and oats, barley and rye are grown in appreciable quantities.

In Hartley the effects of the season are apparent in the returns, though to a much less extent than in the southern and western districts. The average yields were distinctly reduced, many of the crops being so poor that they had to be converted into silage or stock turned into them. Considerable attention is being paid to other crops besides maize, and with good success.

Lomagundi felt the failure of the February rain to a less degree, although the average return is reduced by a full bag per acre. Side crops receive less attention than they deserve, judging by the good yields obtained for such things as sunflowers, potatoes, sweet potatoes and ground nuts. The last, though not much grown, gave up to 15 bags to the acre. Absence of many farmers from the district on war service, and the fact that those remaining are frequently carrying on the farms of absentees as well as their own, in a measure account for the paucity of crops other than maize.

Mazoe and Salisbury districts also suffered from the drought comparatively little, although the diminished return of maize in districts which are the chief producing area, seriously affects our total output. Other crops than maize shew signs of increasing, especially ground nuts, which are now quite an established crop, the introduction of the Virginia-bunch and Spanish-bunch varieties having overcome the diffi-

culties connected with the native sorts. Hay, including that from manna and teff, is largely made, and silos are general. The increase of acreage under crops other than maize and the gradual consequent practice of a system of rotation, is a notable feature of farming in these older and more advanced districts. Mazoe, with over 30,000 trees in its citrus orchards, easily takes the lead in this branch of the industry.

Marandellas, in spite of the absence of a large proportion of the farmers, shews very satisfactory returns of crops, indicating a creditable revival in the district. Besides being responsible for half the entire tobacco crop, maize yields were better than throughout Matabeleland and the southern parts of Mashonaland. Ground nuts are largely grown, and yield up to 10-12 bags per acre. Citrus trees are very general on an experimental or domestic scale. Silos are frequent. Wheat, oats and rye are less grown than in the adjacent districts to the south, and might perhaps with advantage receive more attention.

In Umtali, along with maize and beans, citrus fruits and lucerne predominate, the climate and the possibilities for irrigation favouring these crops. The same is true of Melsetter, where, however, lucerne is less grown, and wheat, potatoes and oats are more largely planted to meet local needs.

CONCLUSION.

It is satisfactory to be able to record again the fact that the response to our request for crop returns has been ready and almost universal. We regret that it has not been possible to make the list of farmers with their addresses as complete as we desire, with the result that we have had a few complaints of statistical forms going astray. Any assistance to make our list more perfect would be welcomed, especially if persons starting new farms or taking over farms from others, would notify the fact; this would be a great help.

We have referred to the willingness with which figures have been furnished on this occasion, but we may also remark that more promptness in posting the completed forms would greatly facilitate the work in the office and enable the results to be published at an earlier date, thus much enhancing their

value. The proportion of late returns is higher than it need be. A certain percentage will always be delayed by unavoidable causes, such as absence from home, but we receive numerous letters to say that forms have been forgotten or mislaid. This trouble would be obviated if farmers would make a practice of filling in and forwarding their forms immediately after receiving them, or in case of a late harvest, directly the same is finished.

Should there be any farmers who have deliberately refrained from sending in the returns asked for, we would remind them that the Statistical Ordinance was put on the Statute Book by the request of the farmers themselves; that the law is administered honourably in the terms of promises made at the time; that it is a *law*; and that the Government has no choice but to enforce it.

In order to increase the future accuracy of the statistical returns, a few of the common errors in filling up forms may be mentioned. These mistakes are not so numerous as to invalidate our figures, but we should like to see them reduced to the lowest possible minimum. (1) The omission to state the amount of a crop reserved for home use is, perhaps, the most frequent error. (2) Occasionally figures are filled in in the column for "Reserved for home use," while the column for "Total yield" is left blank. (3) In a few instances the signature has been omitted. (4) In others the name of the farm is not given. (5) One or two forms have been received without either signature or farm name, so that we have nothing but the postmark on the envelope to guide us as to the district. (6) In many cases where a man is working two or more farms as one business, the name of one farm only is given. Doubtless it is thought that we know, or ought to know, of this circumstance, but an endless amount of correspondence would be saved if farmers would remember to put in full the names of all farms covered by their returns. (7) Many farms have been re-named by their owners, and what may be called the "private" name is given instead of the official one. It would be safer to give both names. The occurrence of these errors frequently leads to our sending reminders to men who may have already returned forms.

Table I.

DISTRICTS IN ORDER OF ACREAGE OF CULTIVATED LAND.

District.	1914-15.		1915-16.		Per cent. difference.	
	Acres cultivated.	Sequence.	Acres cultivated.	Sequence.	Increase.	Decrease.
Mazoe ...	41,524	1	46,282	1	11·45	...
Salisbury ...	34,745	2	42,332	2	21·83	...
Hartley ...	21,641	3	21,269	3	...	1·71
Lomagundi ...	12,869	4	12,272	4	...	4·63
Gwelo ...	8,656	5	11,939	5	37·92	...
Makoni ...	5,600	8	8,335	6	48·83	...
Marandellas ...	7,141	6	7,106	7	...	0·49
Insiza ...	4,932	9	6,017	8	21·99	...
Umtali ...	4,852	10	4,986	9	2·76	...
Bulalima-Mangwe	3,838	12	4,430	10	15·42	...
Nyamandhlovu	3,490	14	4,154	11	19·02	...
Charter ...	3,601	13	4,123	12	14·49	...
Bubi ...	2,996	15	3,763	13	25·60	...
Chilimanzi ...	2,630	17	3,561	14	35·39	...
Umzingwane ...	3,929	11	2,758	15	...	29·80
Bulawayo ...	2,095	18	2,737	16	30·64	...
Victoria ...	2,711	16	2,569	17	...	5·23
Matobo ...	939	24	2,241	18	138·65	...
Selukwe ...	6,370	7	2,123	19	...	66·67
Melsetter ...	1,894	20	2,088	20	10·24	...
Wankie ...	1,052	23	1,874	21	78·13	...
Mrewa ...	*1,918	19	1,687	22	...	*7·09
Gutu ...	See Ndanga	...	1,142	23	...	...
Gwanda ...	1,560	21	1,055	24	...	32·37
Ndanga ...	†1,537	22	797	25	†26·15	...
Belingwe ...	597	25	611	26	2·34	...
Inyanga ...	286	26	600	27	109·79	...
Darwin ...	See Mrewa	...	95	28	...	...
Chibi ...	See Ndanga	...	...	29	...	...
Mtoko ...	See Mrewa	...	...	30	...	...
	183,403	...	202,946	...	10·65	...

* Includes Darwin. † Includes Gutu.

Immunity

IN ITS RELATION TO THE STOCK DISEASES OF SOUTHERN RHODESIA.

By L. E. W. Bevan, M.R.C.V.S.,
Government Veterinary Bacteriologist, Southern Rhodesia.

PART II.

There is an old saying that "an ounce of practice is worth a ton of theory," and those who have followed the previous chapter dealing with the theory of immunity may be inclined to subscribe to this opinion. Pasteur in one of his earliest speeches stated "without theory, practice is but routine born of habit. Theory alone can bring forth and develop the spirit of invention," and so well did he justify the faith which was in him that the famous English physiologist, Huxley, said of him, "Pasteur's discoveries alone would suffice to cover the war indemnity of five milliards paid by France to Germany in 1870."

It has been explained how, as the result of the successful resistance of the body to foreign elements invading it, "anti-bodies" are produced, often in excess of immediate requirements, which are specific against those elements and serve to protect it against further invasion.

The observations of Jenner shewing the protection afforded by recovery from cow-pox against subsequent infection by small-pox drew attention to this fact, which was still further emphasised by the work of Pasteur in connection with an outbreak of chicken-cholera which he was called upon to investigate. Having discovered the cause of this disease to be a bacterium, and having succeeded in cultivating it in artificial

media, Pasteur tested the virulence of such cultures when introduced into fowls. He found that as long as the culture flasks of chicken-cholera microbe were "sown" without interruption within intervals of 24 hours, the virulence remained the same; but that when old cultures were used the virulence of the microbe became attenuated, so that chicken inoculated with them became only slightly ill and recovered. This attenuation was found to be due to the action of oxygen; and by exposing cultures for varying periods to the action of the air, different strengths of vaccine could be produced. "Finally," Pasteur explained, "if you take each of these attenuated cultures as a starting point for successive and uninterrupted cultures, all this series of cultures will reproduce the attenuated virulence of that which served as the starting point; in the same way non-virulence will reproduce non-virulence." But a still more important discovery was made when it was found that when chicken which had shewn no ill effects when inoculated with a weakened culture were inoculated subsequently with a culture of deadly virulence, they proved to be immune.

Later, Pasteur, when investigating anthrax, which destroyed annually many thousands of sheep and cattle in some of the French provinces, endeavoured to apply the principle of vaccination suggested by his researches in chicken-cholera; but, whereas the bacterium of that disease became weakened by contact with air, the same attenuation did not take place with the bacillus of anthrax, which produced spores highly resistant to such influences. It was found that if the anthrax organism was cultivated at a high temperature (42 degrees C. or 43 degrees C.), the bacteria lived and reproduced themselves, but did not give rise to spores, and such cultures lost their virulence. By cultivating such attenuated organisms at a lower and favourable temperature, they would give rise to germs of the same reduced virulence, and in this way vaccines of known strength could be prepared; those of lowest strength causing no disturbance when inoculated into an animal which, by resisting them, derived immunity against cultures of greater virulence.

Upon these discoveries was based the principle of vaccination, whereby, as the result of the introduction of a weakened organism which can be overcome, the defences of the body

are, as it were, educated, so that they can subsequently resist the parasite possessing its natural virulence. In this way vaccines have been prepared conveying protection against plague, cholera, typhoid, erysipelas, pneumonia, puerperal sepsis, and several diseases due to pus-forming organisms. In these instances the vaccines are produced in different ways; the bacteria, having been grown upon media containing all the elements necessary for their nutrition, are weakened by exposure to heat, chemicals or other influences which reduce their virulence; and are then introduced in advance in order to convey protection against natural infection to which the subject may subsequently be submitted. Sir Almroth Wright discovered a further use for such vaccines by applying them to subjects already naturally infected, but capable, nevertheless, of overcoming the weakened organism. By the destruction of the vaccines anti-bodies were produced which could then be opposed to the original invading bacterium of natural virulence.

In the previous chapter it has been explained that bacteria produce their harmful effects in several ways, but chiefly by the production of poisonous substances or toxins; and by growing bacteria artificially it has been possible to obtain these poisons. This has been of practical value, because immunity against some infections includes resistance not only to the bacterium itself but to the poison which it produces. For example, in the case of diphtheria, although the primary cause is the presence of the diphtheria bacillus in the characteristic membranes of the affected throat, the most harmful symptoms of the disease are due to the poisonous material manufactured by the bacillus and thrown into the system. It was by studying this disease that Roux discovered the important part played by toxins and found a means of combating them. He inoculated a horse with diphtheritic toxin, altered by the addition of iodine, in doses very weak at first, but gradually growing stronger; and he found that the horse grew by degrees capable of resisting stronger doses, and at last tolerated enormous quantities of pure toxin. If such a horse was bled from the jugular vein, and the blood was allowed to coagulate, and the liquid part of it, or serum, was collected, certain elements were found in it which had a specific effect against the diphtheria toxin, and were known as anti-toxins.

This discovery pointed to a method of obtaining from animals which had recovered from a disease anti-bodies specific against the cause of the disease and capable of being put to preventive or curative uses. As the result of recovery, only a limited number of these anti-bodies are produced, but by re-inoculating the recovered animal with large quantities of the poisonous material, it becomes hyperimmunised, or fortified against the disease, so that large quantities of anti-bodies are thrown out and are retained in the serum, the therapeutic properties of which become enormously enhanced.

Thus we are in possession of several methods of conferring immunity, either *active* by the injection of vaccines or weakened virus, or *passive* by the injection of anti-bodies obtained from the serum of an animal actively immune against the disease in question. We can now discuss the application of some of these methods in dealing with our local diseases.

Contagious Abortion.—This is a disease due to a specific bacterium known as the *Bacillus abortus*, which, having made its way by the mouth, or by way of the genital tract of a pregnant cow, affects the uterus and fœtal membranes, causing the abortion of the fœtus. In Great Britain this is regarded by veterinary authorities as one of the most formidable of the diseases of cattle. It is said to cause in New Zealand a loss of £200,000 to £300,000 per annum in milk alone, and many millions of dollars in the United States of America.

Within the last few years this insidious disease has made its appearance in Southern Rhodesia, although, owing to climatic conditions, the large areas grazed by our stock, and to its early detection and control, it has not assumed very grave proportions. The discovery of this disease in this country may be attributed to the practical application of one of the facts discussed in the first chapter of this article, namely, that when bacteria are inoculated into a body which can resist them, anti-bodies are produced which possess the power of causing similar bacteria when suspended in a fluid to adhere or agglutinate in clumps. The so-called agglutination test, based upon these principles, is performed as follows :—

The specific bacteria of contagious abortion, having been isolated, are grown in flasks containing suitable nutritive materials in the form of a jelly, upon which they produce a

white scum or film. This is washed off, and shaken up in water to form a thin emulsion. Blood is collected in special pipettes in which the serum separates from the clot and may be drawn off as a clear amber-coloured fluid. If a drop of this serum taken from an infected animal is added to a quantity of the emulsion in dilutions varying from one drop of serum to fifty or even five hundred of emulsion, it will cause the bacteria in the emulsion to cluster together or agglutinate and finally sink to the bottom of the tube, leaving the supernatant fluid water-clear. If, however, the serum is taken from an animal which is free from the disease, this phenomenon does not take place. Moreover, the serum is specific for the *Bacillus abortus*, and will not cause a similar agglutination of any other bacterium. By means of this test it has been possible to detect the disease in herds where it was little suspected, and it has played an important part in the detection, control and elimination of this insidious malady.

It is a well-known peculiarity in connection with contagious abortion that, provided infected animals are not introduced from without, the disease tends to wear itself out and in a few years to disappear from the herd. Moreover, the majority of cows do not abort at two successive pregnancies, although there are exceptions to this rule. These observations suggest that in some way a certain amount of immunity is established.

It has already been stated that the bacillus of abortion produces its harmful effects upon the lining membranes of the womb and the envelopes of the fœtus; and although it may gain entrance into the body through the mouth and travel from the alimentary tract by way of the circulation to the uterus, it apparently does not cause any harmful effects to tissues *en route*. If there is no fœtus, no harm is done; and it is known that if a cow that has aborted is kept from the bull for a period of about six months, the infection of the womb dies out. Indeed, it would almost appear that the presence of the bacillus in a non-pregnant animal acts as a foreign body which, in accordance with axioms of immunity, affords the stimulus to the production of anti-bodies specific against it, rendering the microbe harmless to future conceptions. On this hypothesis it has been sought to convey immunity by introducing into non-pregnant animals large numbers of the abortion bacillus

grown artificially at the Laboratory, and vaccines have been produced accordingly which have been used extensively in Great Britain and in this country with very beneficial effects. The best results have been obtained in England by injecting enormous doses of emulsion of living organisms. But in Southern Rhodesia, where it is often difficult to determine whether a cow is pregnant or not, the introduction of living vaccines might be attended with a certain amount of risk because such a vaccine itself might give rise to abortion. Vaccines made up of the dead organism have therefore been used, and experiments have shewn that even these will produce an appreciable number of anti-bodies in the treated animal without risk, and certainly sufficient to justify the procedure, which can be applied with very little difficulty. By withholding the bull from a herd so that cows which have aborted may remain barren until they become naturally immune, by as far as possible eliminating the various sources of infection, and by conveying artificial immunity by means of vaccines to susceptible animals, there is every prospect of successfully eradicating the disease from infected herds and eventually from the country.

It is a fortunate circumstance that in Southern Rhodesia there are very few animal diseases of bacterial origin; and it is a hopeful sign for the future that our stock, although subject to not a few grave maladies peculiar to the country, escape many of the plagues which handicap the pastoral industry in other parts of the world. For example, *Tetanus* is rarely, if ever, met with, so that the castration of our stock can be performed with comparative safety; *Anthrax*, which elsewhere devastates all classes of animals, is rarely encountered, and only in circumstances which indicate that it has been introduced from without; *Quarter-evil*, a deadly disease of sheep and cattle, is seldom seen. Our cattle are entirely free from tuberculosis, which in Great Britain affects some 30 per cent. of bovine animals and causes enormous losses in other countries; our equines are equally exempt from glanders, in which respect this country enjoys an almost unique distinction. The danger of the introduction of the last two diseases is avoided by the testing of all imported animals as they enter this country. For this purpose tuberculin and mallein are employed respectively. These are the poisonous products

obtained by the growth of the specific bacteria in broth, from which they are separated by filtration. If small quantities of tuberculin are inoculated subcutaneously into an animal suffering from tuberculosis, a violent reaction follows, characterised by a definite elevation of temperature. If a few drops of mallein are similarly introduced into a glandered horse, a rise of temperature results, with an enormous swelling at the seat of inoculation and general malaise. If the animals tested are free from these diseases, no ill effects occur as the result of the inoculation. The actual cause of these reactions is not exactly understood, but it is suggested that a balance is established between the disease and the resistance of the invaded animal, and that is disturbed by the addition of even minute doses of the specific toxins. Other explanations are offered, such as anaphylaxis, which is a condition of hypersensibility, the exact opposite to immunity; these, however, cannot be discussed here. It is sufficient to recognise that these two agents have enabled the veterinary authorities to keep this country free from two of the most serious and costly animal diseases.

Having thus briefly dealt with the bacterial diseases, we will now consider those due to the so-called ultra-visible organisms, those which are so small that they have not been seen even with the aid of the most powerful microscope. Of these one of the most important is *Rinderpest*, a disease from which at present Southern Rhodesia is entirely free. It exists, however, in German East Africa, and in view of the possibility of it making its way south, it may be well to discuss briefly the methods of dealing with it.

Rinderpest is an acute contagious disease of cattle, but also infective to sheep, goats and wild animals. Cats, dogs, horses, birds and man are said to be immune.

Different breeds of cattle present varying degrees of susceptibility to the disease. "The cattle of the steppes of Southern Russia, Hungary and Roumania take rinderpest in a mild form, and often recover in about eight or ten days. They are believed to possess to some extent hereditary immunity" (Cross). In India the hill cattle when infected suffer a more acute form of the disease than those in the plains, and in Central Africa Montgomery has shewn that the cattle of Western Uganda are more susceptible than those in British

East Africa, which possess a marked resistance. It is believed that the cattle of those districts which escaped the last passage of rinderpest through Africa are more susceptible than those of the districts in which it prevailed, and that the existing cattle of the latter areas, like the European cattle referred to, possess some degree of inherited immunity. Animals which have recovered naturally from the disease acquire an active immunity.

"The contagium is contained in the excretions and secretions of the body, in the red-corpuscles of the blood, in the peritoneal fluid, but not in the bile or blood serum; but blood-stained bile or serum containing the slightest trace of red colour is virulent" (Cross). Koch, when studying the disease in South Africa in 1896, recognised that the bile from the gall-bladder of infected animals, when injected into susceptible animals, conferred upon them a certain degree of immunity. He believed that the organism of rinderpest present in the bile was restrained by the preventive action of the bile. This discovery was eagerly welcomed and largely made use of; but the bile inoculation presented several disadvantages, in that only certain biles were suitable, and, as only a limited supply could be obtained from any one animal, a large number of cattle had to be sacrificed to provide sufficient and suitable material. Moreover, putrid or red-coloured biles could not be used. Pure bile had to be used within four days of collection, and its immunising effects were not complete until some ten days after injection, the immunity conferred being of short duration, not more than four months on an average. As the proportion of virus and immunising substance present in different biles varied, the results were irregular. Edington claimed to have overcome many of these disadvantages by adding a certain proportion of glycerine, such glycerinated bile remaining active for considerable periods. It was safer than pure bile, and was thought to possess some curative properties and also to confer immunity of a temporary or "passive" nature. The dose varied from 15 c.c. to 30 c.c., according to the size of the animal, and a subsequent injection of pure bile was sometimes given ten days after to prolong the immunity conveyed.

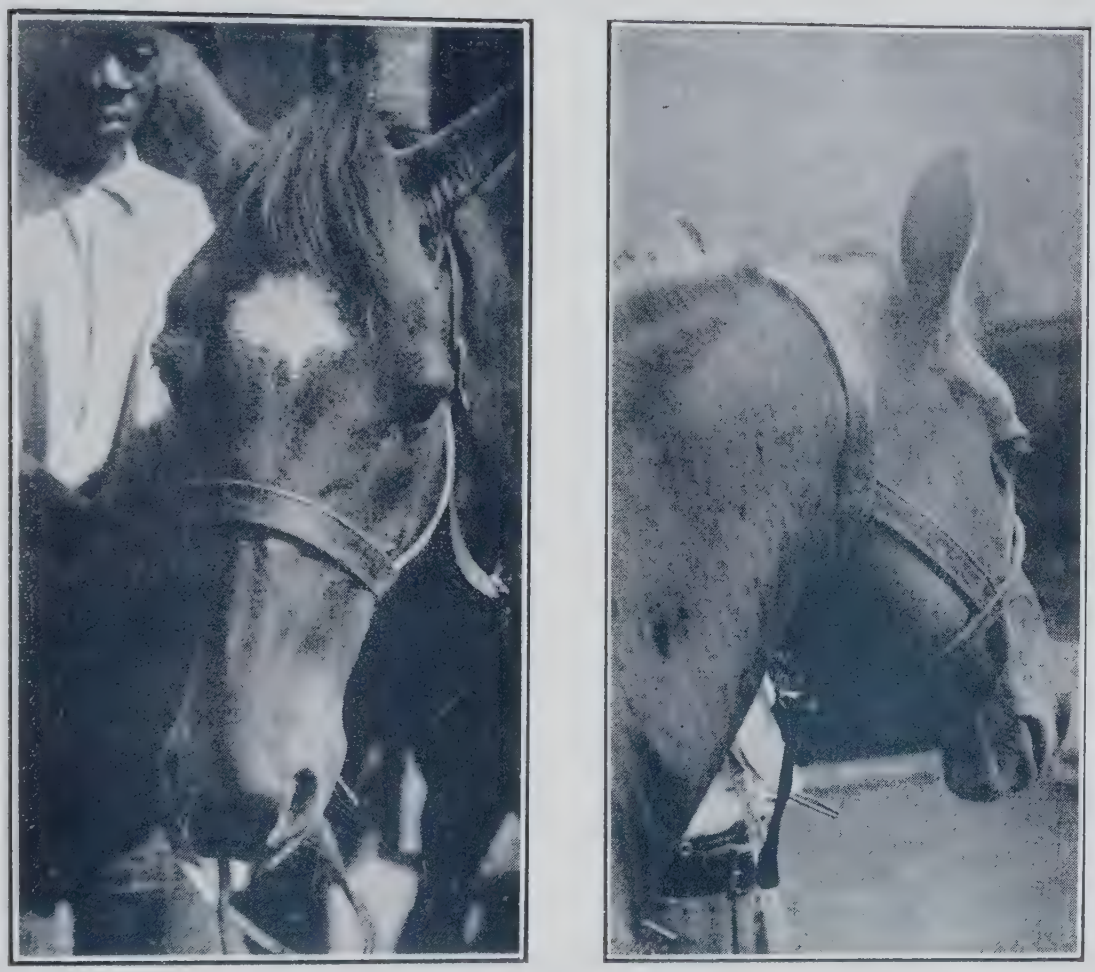
Koch, in 1897, reported to the Secretary of Agriculture of Cape Colony "that blood serum of cattle which have recovered

from rinderpest had a certain immunising effect upon healthy stock when inoculated with it." After some valuable work by Bordet and Theiler, who shewed the immunising effect of defibrinated blood from recovered animals, Kolle and Turner elaborated the idea adumbrated by Koch and placed the serum method of conveying immunity upon a sound basis. They introduced the method of "fortifying" or "hyperimmunising" recovered animals with successive and increasing doses of virulent blood, so that a serum of higher potency—that is, richer in anti-bodies—was produced. By inoculating all susceptible animals likely to come into contact with infection with standardised doses of such serum, a passive immunity, lasting some eight or ten days, was afforded, and by repeating the doses at intervals, it was often possible to protect animals during the course of an outbreak. Later this method was improved by the sero-virus inoculation, which consists of the introduction of virus controlled by a simultaneous injection of immune serum in another part of the body, the quantity of serum necessary to control the virus being based upon the strength of the virus used, the susceptibility of the cattle to be treated and the restraining power of the serum, the quantities being standardised by preliminary experiments. "We thus obtain a double immunity, one part immediate, the other permanent; to get this result, however, the serum must not be mixed with the virulent blood, for when this is done the immunity conferred is trifling or nil. On the other hand it is complete, and persists for several months when the protective serum is injected separately on one side of the body and the virulent blood on the other" (Metchnikoff). This method has now been adopted in nearly all countries ravaged by rinderpest, and has proved of inestimable benefit in controlling this plague.

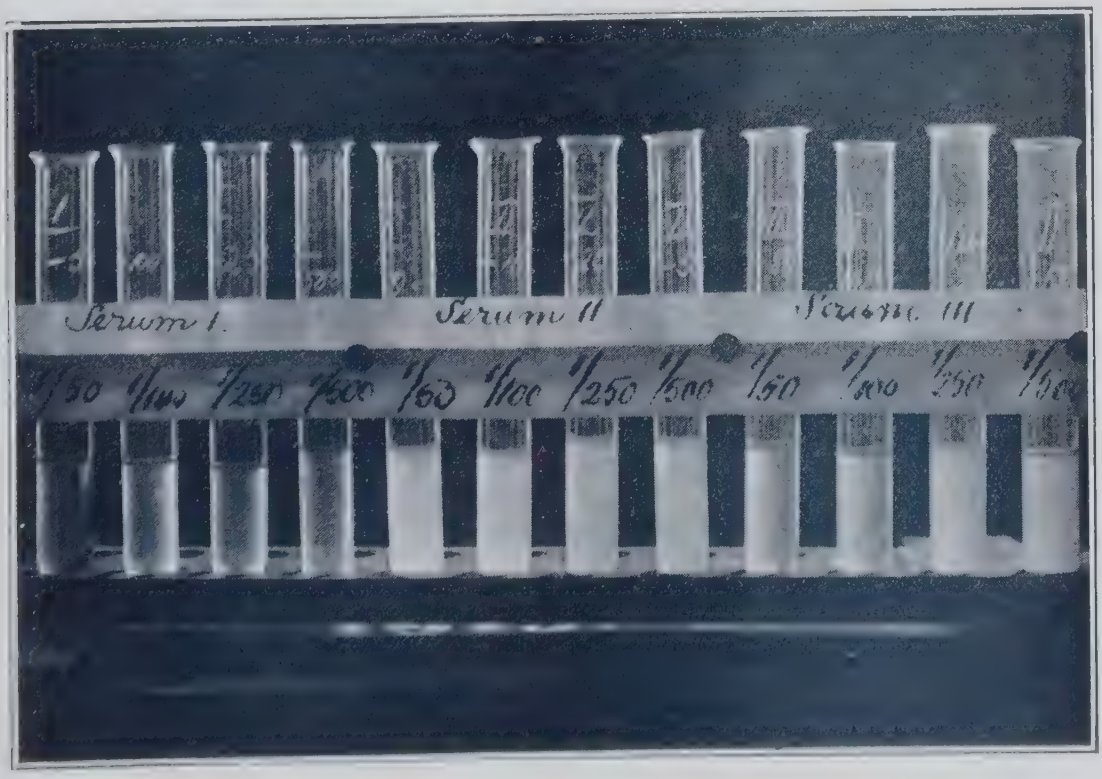
The chief objection to this method lies in the cost of producing hyperimmune serum. To do so a recovered animal has to receive enormous doses of virulent blood, which is obtained from an animal previously immunised. Such large quantities of virus are required that it has been found necessary to bleed to death the animal supplying it. The slaughter of a large number of animals for this purpose is the chief expense. Recently, in combating the disease in the Philippines, Ward and Wood, impressed by the necessity of producing cheaper

Half bred Shorthorn Ayrshire Heifer. Best dairy animal, Gwelo Show, 1914.

Case of Horsesickness (Dikkop) shewing typical effusion.



Cases of Horsesickness (Dikkop) after experimental inoculation.



Agglutination Test. Serum taken from three sheep, added to emulsion of bacteria in varying proportions, the sheep having been inoculated with different vaccines. First group of four tubes shews marked re-action, the third group slight re-action, and the centre group no re-action, the emulsion bacteria remaining unaffected.

serum, obtained it from animals which had been immunised by the simultaneous method as applied under "field" conditions, and had not been hyperimmunised; and found by numerous experiments and practical experience that excellent results were obtained, the lower potency of the serum being made up by increasing the dose. "At the outset, the work was conducted cautiously, with little consideration of overhead charges. However, when it was in full swing with the time of the men profitably occupied, the cost to the Government was 33 cents apiece for 1,056 animals injected in one month. Had the hyperimmunised serum been employed, the cost would have been four dollars per animal for the one item of serum" (Ward). Having on hand, as we have in Rhodesia, a limited stock of hyperimmune serum with which to commence an anti-rinderpest campaign, this method affords an economical and simple way of carrying it on when the original supplies become exhausted.

Horse-Sickness.—This is another disease which also is attributed to a so-called ultra-visible organism; the cause, whatever it may be, has not been seen, and is so small that it can pass through a fine-grained porcelain filter. The blood, the exudates, and the bronchial secretions of an affected animal contain it, but the urine is said to remain unaffected. Horses are highly susceptible to the disease, mules and asses to a lesser extent. The infected blood, when injected into sheep and goats, will often cause a characteristic elevation of temperature, and the blood of these inoculated animals, taken at the time of the reaction and introduced into an equine, is capable of setting up the disease. Dogs also may be infected by inoculation and by feeding upon infected meat. This was clearly shewn by the writer in 1911, when a number of hounds of the Gwelo Hunt developed a mysterious sickness after feeding upon the carcase of a mule which had died during the process of inoculation against horse-sickness. Blood taken from two of them was brought to Salisbury and was inoculated into a horse, which died of typical "dik-kop" ten days after the injection. During the *post-mortem* examination pieces of meat from it were given to a dog, the temperature of which was carefully taken and was found to be elevated on the 13th day after the meal, remaining so for several days. On the 15th day blood was taken and was inoculated into a horse,

which again suffered from characteristic symptoms of horse-sickness. This observation suggests that the susceptibility to horse-sickness may have a wider range through the animal species than is generally suspected.

It is said that the virus rapidly disappears from the blood of an animal after recovery, but it is a well-known fact that so-called "salted" horses are liable to suffer relapses of the disease, which would suggest that the virus is retained in some tissues or organ of the body, although in ordinary circumstances held under restraint. Animals which recover from the disease, or become "salted," acquire a certain degree of immunity, but this is by no means complete against re-infection. It is a common observation that a horse "salted" in one district will contract and sometimes die of horse-sickness in another, and it has been found by laboratory experiments that the immunity against one strain of horse-sickness virus may not hold good against another strain of different origin. Theiler has found that "the serum of an animal which has recovered from the disease has no preventive value whatever," but that "the serum of an immune animal which has periodically been immunised acquires immunising properties," and upon this basis he has elaborated a system of inoculation against the disease.

Since 1905 this system of immunising mules against horse-sickness by a simultaneous injection of serum and virus has been practised, and Southern Rhodesia has derived enormous advantage from it. More recently Sir Arnold Theiler has perfected a similar process for the inoculation of horses. In achieving this success he has had to overcome innumerable and unforeseen difficulties, but the most recent advices state that the method is now in general use, and it is hoped that a supply may soon be available in this country. For the last ten years experiments have been carried out on a modest scale in Salisbury with a view to conferring immunity upon horses by means of an attenuated virus or vaccine, and during the last year fair progress has been made, some 104 Police horses having been treated and having suffered from horse-sickness, with a loss of ten animals. Recovered animals have proved themselves markedly resistant to inoculation with known deadly strains of virus; but the protection afforded against natural infection in the different districts remains to be proved.

It may, therefore, be confidently anticipated that in one way or another science will soon succeed in affording a means of protection against this disease, which annually causes enormous losses of equines in this country. It is difficult to state what these deaths actually amount to, but the most accurate figures available are those shewn at the last census taken in 1911, in which year, although a notably mild horse-sickness season, some 494 horses and 578 mules are shewn to have died. Although these figures are far from complete, the approximate value of these animals cannot have amounted to less than £30,000, and since the breeding of horses and mules cannot be undertaken in this country, to replace these losses animals to this value have to be imported from without, so that the sum is entirely lost to us. Apart from the actual loss from death, the interference with the development of the country, the waste of time, and the inconveniences associated with transport must also be taken into consideration in computing the losses occasioned by this disease.

Blue-Tongue, or malarial catarrhal fever of sheep, is a disease in many respects resembling horse-sickness, but fortunately not very prevalent in Southern Rhodesia. From the point of view of immunity, it is of interest on account of the varying susceptibility of different breeds of sheep. "The pure-bred merino is the most susceptible, especially when young, the disease becoming less severe as the adult stage is reached." . . . "Cross-breds, both of the Africander and the Persian, suffer in a considerable degree, but less severely than the merino. It may be that the increased resistance of the adult sheep is due to partial immunity acquired from a previous attack. Lambs do not suffer till after they are weaned. Pure Africander and Persian sheep suffer much less than the merino" (Spreull). Although goats do not apparently naturally contract the disease, it has been shewn by Spreull that they can harbour the infection after inoculation with virulent blood. "Ten Angora goats were so inoculated, from goat to goat in series, and the blood of the tenth reproduced the disease when injected into a sheep." . . . "In a similar way young calves could harbour the blue-tongue infection just as the goats did, and their blood transferred to susceptible sheep reproduced the typical sickness."

Different methods of conveying immunity have been

devised. The first was that introduced by Spreull in 1902, consisting of the simultaneous injection of 2 c.c. preserved virulent blood and 4 c.c. of immune serum, mixed in correct proportions before use. The operation is generally performed one or two months in advance of the earliest date at which an outbreak would be likely to appear. This method was followed by one devised by Theiler, who attenuated the virus by frequent passage through sheep in his laboratory, the vaccine so produced causing a modified form of the disease, but conveying immunity lasting about a year. Later, Watkins-Pitchford also produced a vaccine by attenuating the virus by heat.

It is fortunate that at the present time *Rabies* does not exist in this country, although for several years it constituted a very grave menace to man and animals. As far as the present article is concerned it is principally of interest as an example of immunity conveyed by a vaccine prepared by artificial attenuation.

Pasteur found that rabbits were susceptible to rabies, and that if the ordinary virus of canine "street" rabies was inoculated into them they would develop the disease in about 14 or 15 days; but if the virus was passed from rabbit to rabbit, after a long series of passages it gained in strength until it was capable of killing them in six to seven days. This strength was maintained and was known as the "fixed" virus. By removing the spinal cord of rabbits so inoculated, and by desiccating it, the virus in it gradually lost its strength, so that cords that had been dried for 12 or 13 days were practically inert. It thus became possible to prepare vaccines of different strengths. When, therefore, a human being who had been bitten by a rabid animal presented himself for treatment, the weakest strength was first introduced into him as a vaccine, and day by day vaccines of greater strength were introduced, so that by the 15th day he had received and overcome a virus of far greater strength than that with which he had originally been inoculated by the bite of the animal. In other words, the process amounted to a race between the education and mobilisation of the defences of the patient's body and the incubation of the rabies virus naturally inoculated into him.

(*To be Continued.*)

Maize Growing on Granite Sand Soils.

By G. S. Money.

I write this report on the above subject at the request of the Director of Agriculture in the hope that my observations may prove of benefit to all maize growers on granite sand veld.

I have under observation about 30 acres, in fields ranging from 1 to 10 acres, and it will be seen in the table how these fields have been previously cropped and fertilised, also the yield per acre for the last two years under maize. It is not my desire only to try and prove that sand soils can produce maize under proper working conditions as a payable proposition, but to demonstrate the value of such soils in producing crops on a low average of rainfall and even during drought seasons, as I maintain that this sand soil is far superior to all heavier soils in retention of moisture, although naturally inferior in respect of plant food content. But in a country like this, where the grower is so dependent on the season and its rainfall, I venture to think that we shall find in the much-despised sand soils an asset not only for maize growing, but for the majority of crops.

It will be observed that the best results are off the fields previously cropped to tobacco. This is naturally understood, but it would be interesting to know how many crops of any kind can be reasonably expected prior to rotating or green manuring these fields. This is an observation which requires time. Fertilising sand soils is another matter for careful attention, and the best kinds and quantities required are matters for experiment.

This last season has been very unfavourable to any experiment, owing to the small amount of rain, and the fields under observation suffered badly at the time of cobbing, but the

growth was equal to, if not better than, that of the previous season, and the suckers were very numerous. The latter I had to thin out to give the main plant every chance. Had these been left, and the rainfall been normal, I consider the yield would have been double what it actually turned out, for I maintain that the suckers are capable of producing quite good cobs, without seriously affecting the yield of the main plant. but advise not leaving more than one or two to the plant, and then only if the rainfall is plentiful, otherwise the absorption of moisture by too great a growth would seriously affect the main plant. I know I am up against theory in this respect, and am open to criticism, but I think I am right in saying that the weight of grain taken from a plant and its suckers exceeds that of a plant deprived of its suckers, although the latter may produce larger cobs, but it must be remembered that there is such a thing as an abnormal growth of a plant produced by abnormal conditions, and in these cases the yield may also prove to be an extraordinary one if the plant is left uninterfered with.

With regard to the cost per acre of growing maize, I produce my figures in a schedule made up from data carefully kept, and, although I may differ from many, I must mention that every grower cannot possibly coincide, as some may have to pay higher wages and have greater distances of transport than others. The cost of renewals and repairs would differ according to a man's care of his machinery and the capability of his workmen. Interest on capital must be worked out and added by each individual.

I consider sand soils can be worked far cheaper than heavier soils, as they are more pliable and need little cultivation, and they have the advantage of being planted earlier. thus giving the crop the benefit of a full season for growth.

Although my observations are only in the initial stage, I trust that it may be proved in future that the working and cultivation of granite sand soils is a practicable and profitable proposition to the benefit of all growers working thereon.

TABLE OF RESULTS.

Field.	Acres.	No. of years under crop.	Fertiliser.	1914-15.			1915-16.		
					Fertiliser.	Yield per acre.		Fertiliser.	Total yield.
A.	10	Tobacco, 3 years	Safco	Mealies, 4th year	Nil	17¼ bags	Mealies, 5th year	80 lbs. Fison's per acre	62
B.	3¾	Tobacco, 2 years	Safco	Mealies, 3rd year	Nil	17¼ bags	Mealies, 4th year	do.	32
C.	2½	Tobacco, 2 years	Safco	Mealies, 3rd year	Nil	17¼ bags	Mealies, 4th year	do.	23
D.	2¼	Tobacco, 2 years	Safco	Mealies, 3rd year	Nil	...	...	...	28
E.	2¼	Rapoko, 2 years	Nil	Mealies, 3rd year	80 lbs. Fison's per acre	...	...	...	15
F.	7	Tobacco, 2 years	Safco 1st year, Albatross 2nd year	Mealies, 3rd year	Nil	...	...	...	47
G.	1	Oats, 1 year	Nil	2nd year, Mealies	80 lbs. Fison's per acre	...	...	...	4
H.	1⅙	Rice, 3 years	Nil	4th year, Mealies	do.	...	...	...	6
Total	29¾							Total	217

Approximate average, 7¼ bags per acre.
Date of planting, 15th to 20th November, 1915.
Date in full flower, 30th January, 1916.

A Preservative for Samples of Arsenical Dips for Analysis.

By A. G. Holborow, F.I.C., Assistant Agricultural Chemist.

In outlying districts in Rhodesia, where samples of dipping fluids are taken for the purpose of analysis, it has been found that sometimes as long as a week elapses from the time the sample is bottled until it arrives at the laboratories at Salisbury. This unavoidable delay has been found to be sufficient to effect material changes in the composition of the dip sample. The change referred to is the well-known oxidation of *arsenite* of soda to the less effective *arsenate* of soda. If a sample of dip arrives at the laboratory from the Melsetter, Victoria or Mrewa districts, it is apparent that, due to this chemical change, the figures of the laboratory test would not agree with an analysis of a sample of the same dip if conducted at either of these places at the time the samples were taken. It is obviously unsatisfactory, therefore, to the farmer and the chemist if the analytical report, whilst correct for the sample at the laboratory, does not represent the liquid in the dipping tank.

Again, there is a serious objection to the use of the "isometer" tester on the farm. This is explained by the fact that, whereas the amount of arsenite of soda can be determined fairly accurately in an arsenical dip, the "isometer" wholly fails to register the oxidation product, the *arsenate* of soda.

It is perfectly plain, therefore, that a dip should be tested by a competent chemist in a laboratory especially equipped for the purpose, if reliable results are to be obtained.

In cases where the length of time in transit would render the material in the bottle unfit for satisfactory analysis, it may be wondered what preservative could be added to the dip

sample at the time of bottling to prevent this oxidation. Whilst looking round for a means to inhibit the chemical change, it was found, *inter alia*, that, although preservatives such as are commonly used for milk, foodstuffs, etc., gave little or no result, acids, *i.e.*, sulphuric acid (oil of vitriol) and hydrochloric acid (spirits of salt), had the desired effect.

If the arsenical dipping fluid be made just acid, the process of oxidation is immediately arrested, and no further oxidation takes place as long as the dip remains acid. Commercial arsenite of soda contains free alkali, and it would seem that the oxidising micro-organisms, which produce the change, cannot accomplish their work in an acid medium. There is also no reversion, *i.e.*, change from *arsenate* to *arsenite*, attending the introduction of an acid to the dipping fluid, so that the sample of dip, if made acid at once, remains for a considerable length of time exactly as it was previously when in the tank. There is no apparent reason why it should not remain unaltered for many months, but the experiment was only allowed to proceed for three weeks, as shewn below.

The test was commenced on 2nd December, 1915, with a dipping fluid that had been in use for approximately three months.

SULPHURIC ACID TREATMENT.

Table of Results.

	2nd Dec.	Untreated 23rd Dec.	Treated 23rd Dec.
Arsenic present as arsenious oxide (As_2O_3) ...	% 0·126	% 0·011	% 0·125
Total arsenic in terms of arsenious oxide (As_2O_3)	0·181	0·180	0·180
Percentage of oxidation ...	30·3	94·4	30·7 *

* Experimental error.

From these experiments it is seen that the untreated dip sample became nearly completely oxidised on standing in the laboratory during only three weeks. In the sample to which

was added sulphuric acid until acid, the oxidation process was completely arrested.

It may be thought that the application of this test might be carried further, and the acid added to the liquid in the tank at the time of mixing, with the object of always keeping the arsenic in the unoxidised condition. There appear to be objections to this procedure, and those who have control of dipping tanks are advised not to follow it. One effect of an acid dip would probably be a reduction in the tick-killing power of the fluid, it being supposed that an acid solution would not have the skin-penetrating power that attends an alkaline dip. An acid solution also would certainly tend to eat into the walls of a tank with disastrous results.

The amount of concentrated sulphuric acid to be added to a pint of dip fluid would be approximately 1 cubic centimetre, but the figure mentioned, of course, is not constant. To be effective, there must be added sufficient acid to first neutralise the alkali of the dip and be present in slight excess. This is seen to be the case when a piece of blue litmus paper turns bright red when introduced into the acidified dip.

If cattle inspectors and others desire to use this method for preserving a dip sample for analytical purposes, it is impressed upon them that the sulphuric acid should be added cautiously, and only a little at a time, the solution tested with litmus paper after each addition, and the bottle well shaken before each test. It is important not to overdo the addition of acid, but to add the least amount over and above that necessary to turn the litmus paper red. If a great excess of acid is added to a sample, it will interfere with the process of analysis later. It is interesting to note that the addition of concentrated sulphuric acid, in excess, just sufficient to coagulate the colloidal solids, is the first stage in the laboratory method of analysis. It is hoped now that the difficulty experienced in issuing satisfactory reports upon samples of dip is overcome, and that the method will become general in outlying districts remote from the laboratory.

Home-made Fly Papers.

By Rupert W. Jack, F.E.S., Government Entomologist.

Where house flies are really abundant, a fly paper lasts but a very short time, and if a large number of those sold at the stores are used, the expense is considerable. In consequence of this, recipes for the manufacture in the home of sticky substances of the nature of "Tanglefoot" have been given in a number of entomological publications in different parts of the world. The main ingredients of these are generally resin and a non-drying oil, which are heated together until the resin is dissolved.

A favourite recipe, due, I believe, to Essig in California, is: Resin, 8 parts; castor oil, 5 parts; the resin being weighed in ounces and the oil measured in fluid ounces. This recipe was tested in France by the Entomological Commission in 1915, and found effective under the climatic conditions prevailing there.

Another recipe, evolved and tested by Mr. Rupert Newstead, of the above commission, was: Resin, 2 parts; raw linseed oil, 1 part. This was considered, if anything, superior to the foregoing.

Bourcart, in a volume entitled, "Insecticides, Fungicides and Weed-killers," gives four recipes for "bird-lime," to be used for banding trees to prevent the ascent of insects, and these recipes would, of course, be useful for fly papers.

(1) Heat together and reduce to two-thirds of the original volume $2\frac{1}{2}$ lb. of colza oil and $\frac{1}{2}$ lb. lard, then add whilst stirring $\frac{1}{2}$ lb. of turpentine and $\frac{1}{2}$ lb. of resin. The consistency should be syrupy; if it be too fluid, the heating is to be continued; if it be

too thick, more oil is added. This bird-lime remains sticky for three months.

(2) Heat together 5 oz. of resin, 4 oz. of stearine, and 4 oz. of lard.

(3) Heat together 5 oz. of resin, 2 oz. of lard, and then add 1 oz. of turpentine, and then 2 oz. of stearine; boil to a suitable consistency.

(4) Heat with care 7 lb. of wood tar with 5 lb. of resin; when the whole is fused, add 5 lb. of soft soap, then 3 lb. of cod oil; remove from the fire and stir till cold.

It has been found, however, that, owing presumably to the high rate of evaporation, recipes which give satisfaction in Europe may dry up too rapidly at Salisbury, and experiments have, therefore, been made with a view to finding a preparation that will retain its viscosity for a longer period. The cheapest non-drying oil available in this Territory is ground-nut oil from the Oil Factory at Salisbury. Tests were accordingly made with this oil, commencing with a comparison between resin-ground-nut oil, and resin-castor oil, in the proportion of 8-5. The ground-nut oil was found to be inferior, being too thin and apt to drip. A second preparation, in the proportion of 2 parts resin to 1 part oil, gave very similar results to the castor oil formula 8-5, but it only remained sticky for about five days.

Further tests with resin, ground-nut oil and additions of glycerine, soft soap and crude vaseline gave varying results, the following formula being finally evolved as giving the greatest satisfaction :—

Resin, 12 parts (oz. by weight).

Ground-nut oil, 5 parts (fluid oz.).

Crude vaseline, 1 part (fluid oz.).

The resin should be reduced to powder, and the ingredients heated together, without being boiled, in a suitable receptacle until all the resin is dissolved. Strips of paper may be dipped in the above whilst still hot, and the excess of liquid taken off on the edge of the vessel. After cooling, the papers are ready for use. To avoid dripping, a narrow piece of paper the same length as the width of the fly paper may be folded double

lengthwise and made to embrace the lower edge of the fly paper, where a pin will secure it in position. In very hot weather, in October or November, or in very warm situations, it may be necessary to increase slightly the quantity of resin used in this formula. A preparation made as above, and kept in an ordinary tobacco tin, proved as effective after eight months (March to November) as when freshly prepared. Papers prepared in the above manner remained "tacky" indoors for at least 13 days. None of the formulas tested, however, were of any use after a few hours' exposure to the sun.

Sticky preparations may be utilised with advantage on other carriers than paper, for instance, string, tape or wire. Wire is especially convenient, as it can be easily scraped and utilised for an indefinite number of times.

Farmers' wives and others who suffer from the fly pest during the summer may well consider the question of making their own "tanglefoot" in the home, and so equip themselves to wage more effective warfare against this pernicious disease-carrying pest.

Co-operative Experiments.

EXTRACTS FROM REPORTS RECEIVED FROM FARMERS.

By J. A. T. Walters, B.A., Assistant Agriculturist.

Free issues of seed are made annually to farmers, with the object of experimenting with new, or hitherto untried, crops on their own farms in a small way. The only condition attaching to these issues is that reports shall be furnished to the Department at the end of the season. In this way a good deal of useful information becomes available as to the behaviour of a number of crops under a great variety of local conditions, and the farmer is able to satisfy himself, without great expense, as to the suitability or otherwise of these crops to his own soils. The extracts given below are culled from reports received during the last few seasons. As may be expected, a great number of reports record failure of one or more crops, particularly during the 1915-16 season, when the severe February drought, which was fairly general, resulted in the failure of a great many side crops. In numerous cases farmers report that they have held over the seeds for a more favourable season. Only such extracts from reports are here included as are judged to be of general interest to farmers, and in each case the locality in which the experiment was conducted is indicated.

Dhal.—Good germination; growth patchy, best being 4 ft. high; sown 15th January; not ripe 24th June.—Salisbury.

Twenty-five days without rain from date of planting. Made excellent growth, but affected by aphis and frost before seeding.—Que Que.

Sown 6th January; no rain after 28th February. Grew 5 ft. high, but beans not mature by June. Stood drought remarkably well. Crop fed off.—Gatooma.

A complete failure on black soil, practically none getting beyond flowering stage. Sown 10th January.—Hartley.

One lot sown end of January, and one end of February. In first case 31 ins. rain fell before planting and 9 ins. subsequently. Flowered about mid-June. Resisted early frosts which browned the veld grasses, but was cut down in one night of unusually severe frost before seeds had had time to form. The second plot only received 2 ins. rain after planting, and this was also cut down before seeding. This year (1916) about 40 per cent. of the plants have come up again, and shewed 4 ft. of growth by end of February.—Belingwe.

1915-16; sown in December; drought stunted its growth on sandy soil; one bag of beans reaped off half an acre.—Marandellas.

Germination good; striped beetles ate a lot of the flowers, and frost prevented seed from being as plentiful as it should have been. Will be one of the main crops where it can be grown free of frost. Calves are fond of the hay.—Salisbury.

Ground Nuts.—*Virginian Variety.*—Yield of 14½ bags after cowpeas; good crop also on sandy soil after tobacco unmanured.—Inyazura.

Spanish.—15 bags per acre. *Virginian.*—17 bags per acre; average of 25 nuts to the root.—Sinoia.

Virginian.—15 bags per acre; harvested a month after ripening, causing much loss. *Spanish.*—10½ bags per acre; harvested a month after ripening, causing much loss.—Marandellas.

Tennessee.—18½ bags per acre on good soil, damp; 308 lbs. unshelled gave 256 lbs. shelled (equals 83 per cent.). *Spanish.*—19 bags per acre; 312 lbs. unshelled gave 205 lbs. shelled (equals 66 per cent.).—Mazoe.

Spanish.—15 bags per acre; most successful and good drought resister; vines upright, and might be mown before harvesting nuts. Rainfall, 13 ins. Period of maturity, 4½ months.—Insiza.

Spanish.—930 lbs. per acre, in spite of buck and baboons. —Bindura.

Variety not stated.—15 bags per acre, 5½ months' maturity; stood drought well.—Victoria.

Variety not stated.—20 bags per acre in sandy loam.—Lomagundi.

Spanish.—970 lbs. per acre; took five months to time of reaping. *North Carolina.*—980 lbs. per acre; both sown too late.—Marandellas.

Spanish.—Would do remarkably well in a normal season. —Shangani.

Spanish.—Unfavourable season; gave 4½ bags off one-third acre. *Virginian.*—Later than Spanish, consequently a poor yield.—Bindura.

Spanish.—Six bags per acre; sown late (7th January); great proportion of empty nuts.—Salisbury.

Sown 30th October I got 30 bags per acre, but sown 1st January only got 4 bags per acre. Grey sandy soil.—Gatooma.

1915-16; sown in ridges on the 15th December; crop a failure on account of drought.—Felixburg.

Spanish.—Planted on 15th to 30th November; germination, 85 per cent.; died down in February. Prospects middling until then. Dry weather also first part of December.

Spanish.—Planted 7th January. No further rain till 4th March. This resulted in a 50 per cent. germination only. With the March rains the plants flowered a second time, but set seed badly. A yield of 420 lbs. good nuts per acre was obtained. Had the season been good, the yield would have been five times heavier. On adjoining land, mealies yielded 4½ bags to the acre. I am favourably impressed with the possibilities of this crop as a profitable rotation crop.—Insiza.

Wheat.—*Victoria.*—Under favourable conditions throughout, but crop negligible.—Hartley.

Victoria.—Crop did well after tobacco manured the previous year.

Victoria.—1¼ acres, manured with 10 tons kraal manure, gave 1,240 lbs. grain.—Que Que.

Gluyas.—760 lbs. per acre under irrigation.—Umvuma.

Gluyas.—660 lbs. per acre.

1915-16; *Victoria.*—Failure, owing to continued drought.—Que Que.

Yellow Cross.—Sown on 12th February; 100 lbs. harvested off $\frac{1}{4}$ acre on 31st May; conditions very dry. Very good prospects of growing on large scale in a good season.

Yellow Cross.—Owing to drought, never had a chance. All the same, I am of opinion that it would do well here if given a fair chance.—Melsetter.

Yellow Cross.—Seed germinated nicely, but a three weeks' drought caused the young shoots to be scorched by the sun till past recovery.—Battlefields.

Yellow Cross.—Sown in February; did fairly well, but there was no rain. Consider it worth trying again.—Enkeldoorn.

Yellow Cross.—15 lbs. sown on 2nd January gave 317 lbs. grain; ground well manured, but only 11 ins. rain. No rust.—Shangani.

Yellow Cross.—Sown on sandy soil. Owing to drought, it died off. Insects hastened its failure.

Wheat will not be grown in Matabeleland as a summer crop, except under unusual circumstances and on naturally rich land. Ants prove a formidable enemy, and the burning sun is likely to scorch off the young plants.—Nyamandhlovu.

Oats.—*New Zealand.*—On new ground unmanured, 1,000 lbs. forage per acre. *Sidonian.*—On new ground unmanured, 500 lbs. per acre.—Umvukwes.

Texas.—640 lbs. seed per acre under irrigation.—Umvuma.

Smyrna.—4,019 lbs. oat hay per acre. Period between piping and ripening was abnormally long. *Texas.*—3,484 lbs. oat hay; much waste by vermin, but quality excellent; $5\frac{3}{4}$ months. *New Zealand.*—This variety alone suffered from rust.—Salisbury.

New Zealand.—806 lbs. (seed?); $5\frac{3}{4}$ months. *Texas.*—1,290 lbs. (seed?); 5 months.—Enkeldoorn.

Algerian.—Sown 16th January; still green 4th July. *New Zealand.*—Very thick stand; withstood drought; 700 lbs. per acre.—Lalapansi.

New Zealand.—Stood the drought well.—Gutu.

1915-16; *Burt.*—Failed in a dry position, owing to drought; grew to 6 ins. high; were fed off.

Smyrna and Burt.—Failure, owing to continuous drought. —Que Que.

Smyrna.—Sown 17th January; germinated well, but were killed off by a three weeks' drought.—Battlefields.

Smyrna.—Sown in February, this crop did well and formed good heads, but wanted more rain. Should like to plant five or six acres next year.—Enkeldoorn.

Smyrna.—The best oats I have grown on this farm, and will certainly grow some next year.—Shangani.

Barley.—*Cape Barley* succeeded without any rain or irrigation; sown on 30th April; while oats and wheat were complete failures. The barley gave about a ton of green forage and 20 lbs. grain.—Felixburg.

Barley is never likely to be a success as a summer crop in Matabeleland owing to ants, and the effects of the scorching sun on the young plants during the dry spells we have in the season.—Nyamandhlovu.

Teff Grass.—Did well in every kind of soil.—Plumtree.

Dry; very good for growing largely.—Lalapansi.

500 lbs. hay per acre, in spite of seven weeks' drought.— Bindura.

1,120 lbs. hay per acre; weather conditions bad.—Gwelo.

1915-16; weeds shot up before teff grass and choked most of the grass. The part that grew completely smothered the weeds.—Macheke.

Velvet Beans.—Did well on magnesia soil after a previous crop of kaffir corn.—Lalapansi.

1915-16; sown in December on red soil. They received 14 ins. rain after planting; should have been planted earlier.

On 1st May they covered the ground with up to 40 pods on a plant. Frost on the 10th May damaged the crop, but they are the best beans I have been able to grow, and it has solved the bean problem with me.—Salisbury.

Early frost destroyed many of the flowers; grew well even during dry spell; cattle eat the dry vines readily.—Macheke.

Germination irregular, on account of want of rain; healthy growth, but totally destroyed by severe frost, 24th May.—Lomagundi.

Boer Manna.—Grew 1 ft. high in spite of six weeks' drought.—Bubi.

Most successful; 3,000 lbs. forage and an aftermath on 10.29 ins. rain; soil, light sandy loam; three months period of maturity.—Insiza.

A success; all other crops failures.—Lomagundi.

Came through the drought without a check, and grew 4 ft. high; bulky and excellent forage; 300 lbs. seed and 230 bundles off $\frac{3}{8}$ acre.—Victoria.

600 lbs. seed per acre; $4\frac{1}{2}$ months in maturing.—Marandellas.

Sown in middle of a two months' drought; was a failure, inyouti being superior.—Gwelo.

Mangels.—Stood fortnight's drought in January well; quite a good crop and very promising; light dressing of kraal manure.—Lomagundi.

Half Sugar.—Seed germinated badly, while own seed germinated well alongside.—Makwiro.

1915-16; did no good on sand soil.—Enkeldoorn.

Sown on reddish sandy soil; only a poor germination was obtained in December, and the January and February droughts completely shrivelled these up.

Cowpeas.—Sown late (13th February); did well in spite of drought, although planted in new soil, once ploughed, not cultivated.—Bubi.

5 lbs. *Natal Black* gave 70 lbs. in very dry conditions.—Bulalima Mangwe.

In spite of drought, grew splendidly.—Syringa.

Prospects of growing on large scale promising; 880 lbs. seed per acre on sandy soil manured to tobacco the previous season.—Salisbury.

Linseed.—*Yellow Seeded.*—Sown broadcast without manure on granite vlei soil; gave 255 lbs. per acre.—Umtali.

Yellow Seeded.—Sown in sandy loam; not affected by drought; found it cheap to deal with as regards reaping, threshing, etc. Yield, 210 lbs. off .4 acre—525 lbs. per acre; straw, 970 lbs. per acre.—Que Que.

1915-16; did not get a show this season. Land very hard after last year's abnormal rains.—Plumtree.

Sunflowers.—*Striped.*—Gave 412 lbs. off ½ acre; many empty seeds.—Victoria.

Var.—600 lbs. per acre in spite of drought.—Wankie.

1915-16; did fairly well, but needed more rain.

Rye.—Did well after tobacco, manured, while wheat and oats failed.—Lomagundi.

960 lbs. per acre under irrigation.—Umvuma.

Miscellaneous.—*Kaffir Melon (Improved Green).*—4 tons per acre, in spite of five weeks' drought.—Que Que.

Beggar Weed.—Made excellent growth during long drought, and grew 4 ft. high, while Egyptian clover was a failure.—Victoria.

Chicory.—Sown too thickly; left in ground too long; 336 lbs. dried roots off one-seventh acre.

Japanese Millet.—Did well, and shedding seed freely; came up a second time, providing good winter feed for cattle. Sown in September, it did better than barley, cattle being fond of it.

Napier's Fodder.—Planted 27th February; 6 to 12 inches growth in very dry soil by 1st May.—Matopos.

Majorda Melons.—Sown 13th January; vines still green 27th June.—Wankie.

Japanese Millet.—80 lbs. seed and 120 lbs. hay off $\frac{1}{8}$ acre; wheat failed.—Sandown.

Majorda Melons.—Did well, considering drought; sown 1st February.—Bindura.

Lucerne.—Sown 19th January; germination good; died out for want of rain.—Lomagundi.

Majorda Melons.—Germinated well; mostly small fruit.—Plumtree.

1915-16; *Kale.*—Destroyed by frost on 10th May.—Salisbury.

Kale.—Sown 20th March; looks very promising.—Lomagundi.

Castor Beans.—A failure, owing to drought.—Lomagundi.

Buckwheat.—A yield of over two bags good heavy seed, in spite of drought.—Salisbury.

Buckwheat.—Grew to height of 6 ins., and withered off; soil light dry red.—Macheke.

Buckwheat.—Sown 4th January on red granite sand; total rainfall during growth, 3.32 ins.; reaped 75 lbs. seed off $\frac{1}{4}$ acre. Re-sown on 13th March at rate of 40 lbs. per acre on slightly manured moist soil; grew to 2 ft. high until 14th May, when frost badly damaged it; 1,000 lbs. seed were threshed off $1\frac{1}{2}$ acres, and had the frost not interfered, would probably have yielded 3,000 lbs.—Felixburg.

Majorda Melons.—Gave about 10 tons per acre of small melons under very dry conditions.—Felixburg.

Linseed.—Two pounds of seed sown gave 25 lbs. return with only 2 ins. of rain.—Felixburg.

Paspalum.—Germinated on a black vlei with the first rain, but I think it got dried up afterwards by the drought.—Felixburg.

Rice (Improved Variety).—Conditions altogether too dry.—Rusape.

Vetches.—Sown with rye (rye 5 ft. when cut for fodder); vetches died out after attaining height of 9 ins.—Lomagundi.

Buckwheat (Silver Hulled).—15 lbs. sown gave 639 lbs. grain. The ordinary variety yielded 1,098 lbs. from 25 lbs. seed sown. In both cases the yield would have been heavier with more rain. I think this crop is better to grow on sand soil than mealies, as it is earlier, less work, and a bigger yield. —Shangani.

Napier's Fodder.—Roots planted 6 ft. apart; has had no rain; was watered by bucket when planted only. Every root has grown luxuriantly, and is now quite safe, as we had 1.84 ins. rain on 3rd March.—Insiza.

Napier's Fodder.—Planted in rows 6 ft. apart and watered by hand; has had no rain, but the roots struck, and are doing splendidly. The plants are growing on black, sandy soil.—Shangani.

Buckwheat.—This grain suffers considerable loss from uneven ripening, small game and other pests, as much as 50 to 70 per cent. being lost.—Nyamandhlovu.

Beggar Weed.—Sown end of January, 1915, and reached height of 18 ins., seeding freely. Plants have come again this year, both from seed and from the old stocks, and by end of February had reached a height of 2 ft. Foliage somewhat sparse for forage plant. It has shewn more vigorous growth than Provence lucerne grown next to it, resisting drought better, and being free of pests.—Belingwe.

Egyptian Clover.—Sown with manna, this crop did well; sown alone, it failed.—Sandown.

Majorda Melon.—Grown among mealies, which shaded the plants, it withstood the February drought; excellent rains in March brought long streamers, with quantities of melons.—Salisbury.

Paspalum.—Looks promising; the ground is nearly covered with plants grown from seeds broadcasted in January: nearly all plants in seed and untouched by frost on 27th June: subsequently frosted in July, but was growing strong again in mid-September.—Salisbury.

Notes on Bee Keeping.

By Frederick Sworder.

In ancient times those who studied bees were of opinion that wax was collected by them from flowers, and that, when constructing combs from this substance, they merely had to knead and mix it with saliva in order to render it more pliable. It is acknowledged that wax does exist and exude from the surface of the leaves and berries of many trees. This substance is termed vegetable wax, and, although resembling beeswax, when treated chemically it is found to be not wax at all, but a kind of fat.

It is now known throughout the whole bee world that beeswax is not found ready made in nature, but that it is formed in the body of the worker bee; it, unlike either the queen or drone, being supplied with suitable glands on the under side of the abdomen from which issue secretions in the form of tiny white scales.

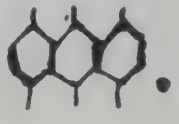
When a swarm takes possession of an empty hive or box, the bees climb up the sides and gradually advance along the roof, carefully securing themselves by the hooks of the front legs, in order to sustain the weight of their comrades. If the interior of the hive can be examined, it will be seen that the bees have arranged themselves in the form of a cluster, made up of festoons, formed by bee after bee hooking her forefeet into the hind feet of the one above. In this position they remain motionless until the temperature is raised to the degree necessary for the production of wax, *i.e.*, 87 to 98 degrees F.

When food is plentiful, the increase of population is so great that the accommodation in a stock hive becomes severely taxed, and if the bee-keeper does not take steps to remedy

matters with the appliances at his disposal, the bees will accomplish it in their own way by swarming. Conditions both inside and outside the hive being favourable for swarming, those bees of the stock hive about to leave gorge themselves with the honey stored in their old home. On arrival at a new abode, they will be called upon to furnish it with suitable receptacles in which future generations must be reared; then it is that the honey consumed by the worker bees will be utilised for the production of beeswax. It is this close clustering, coupled with or acting on the already consumed honey, which converts this food into wax scales, these exuding from the ventral plates on the under side of the bee's abdomen.

From this position these wax scales are removed by the pincers on the hind legs, being then transferred to the front legs and finally to the mouth, there to be masticated by the jaws and made sufficiently pliable with the addition of saliva. In this condition these small bits of wax, as fast as formed, are carried by each individual bee and made fast to the topmost point of the hive. Presently from this starting point appear shapeless blocks of wax, which begin to assume their hexagonal form. While the first cells are being shaped by the jaws of the workers, new ones are in process of formation, and the comb gradually increases in size in a downward direction.

By carefully examining a piece of honeycomb, it will be noticed that each cell is formed with a perpendicular wall on each side or face, these collectively giving, in consequence of their position, the strongest possible resistance to downward strain. Taking into consideration the delicate nature of honeycomb, its strength is not wholly due to the material of which it is constructed, but to its symmetrical design. The perpendicular walls constituting the sides of each cell are strengthened by diagonal struts, giving the whole mass great rigidity and power to resist downward stresses thus—



Now, if Plate No. I. is carefully examined, it will be seen that the bees have committed a gross error, for no perpendicular sides or walls can be detected throughout the whole

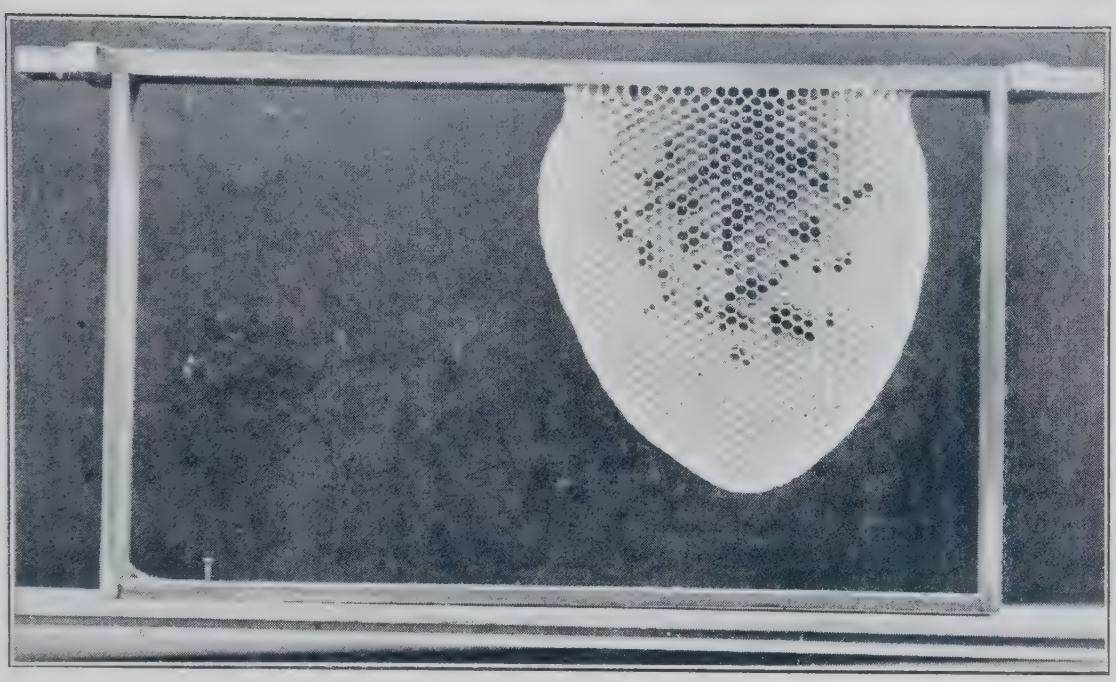


Plate I.—A comb naturally built in a frame. The dark cells contain pollen. Eggs can be seen in the lower cells.

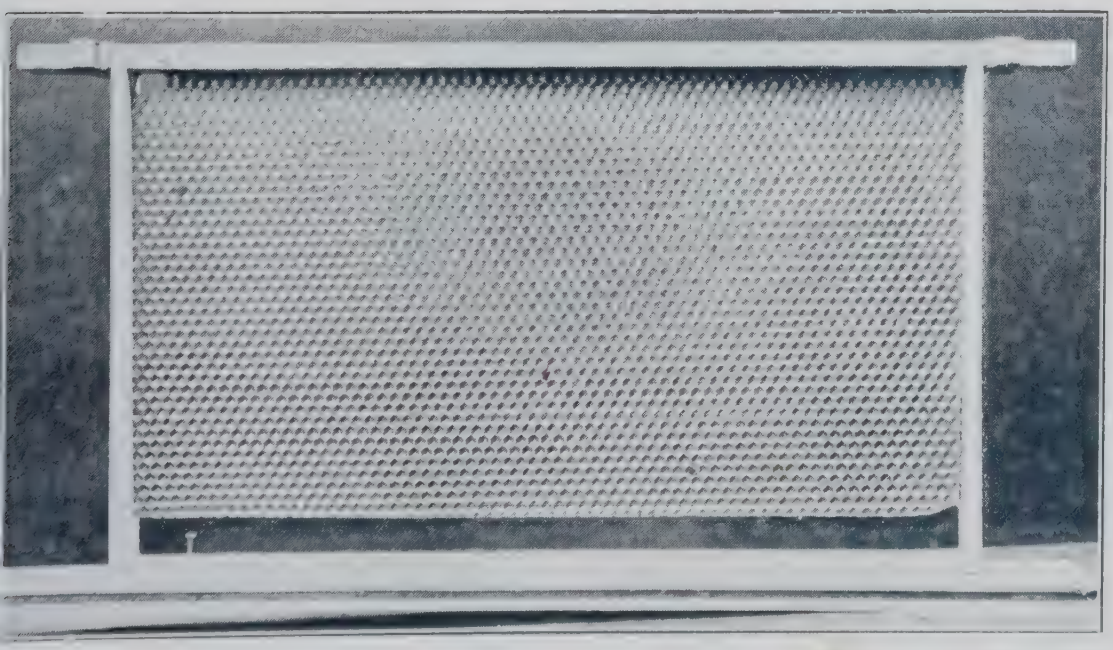


Plate II.—A "standard" frame with brood foundation and wired. The centre portion shews where the bees have commenced to work on the foundation.

comb. The top and bottom of any selected cell, being horizontal, are, comparatively speaking, useless in resisting downward strain, considering that the comb hangs from the roof, while the side of any cell, being at an angle of about 30 degrees to the perpendicular, is in its wrong position, thus throwing a large portion of the downward tension on the midrib. This pattern or false arrangement makes stretching, distortion or even rupture all but inevitable, yet the true hexagonal cell is there. The peculiar formation of this comb, as seen in Plate No. I., is quite exceptional, and full of interest to any bee-keeper.

Quite six years ago, while a resident in the Transvaal, this comb was built in a hive in my own apiary. The hive contained only two frames, which were absolutely empty, that is, no narrow strip of comb foundation had been previously inserted in the top bar from which the bees could make a start. It is a faithful representation of a comb naturally built by a swarm which took possession of the hive, and being attracted by its exceptional construction, I secured the photograph. In the original photograph eggs are clearly seen in some of the lower cells.

Commercial bee-keepers soon realised that the process of comb-building entailed a great strain on the bees, besides occupying too much time. The formation or construction of honeycomb was then closely studied, with the result that in a few years the manufacture by machinery of comb foundation was commenced, and as time advanced it soon became perfected, being now turned out in sheets by the hundredweight, and largely used by bee-keepers.

Plate No. II. shews a frame fitted with brood (worker) foundation and wired. The wire has been embedded with a hot wheel into the sheet of comb foundation, therefore it is scarcely visible, but it can be clearly seen in Plate No. III. The frame as seen in Plate No. II. was inserted into a hive for a few hours, and in the centre of the comb quite a number of the cells have been drawn out by the bees. On each sheet of comb foundation there is a sufficient amount of wax to enable the bees to construct their cells from the pattern given them without adding thereto.

Conditions being favourable, a frame fitted with comb

foundation, if placed in the centre of a swarm, will in a few hours be fully drawn out as seen in Plate No. III. I remember placing a swarm, numbering over 20,000 bees, into a hive containing ten frames as seen in Plate No. II., and in 48 hours the whole ten frames of foundation had been drawn out as seen in Plate No. III., while in the centre frames of comb the queen had commenced to deposit eggs. On each side of a sheet of worker foundation there is the commencement of about 3,000 cells, and, where a hive holds ten frames, a small calculation will shew that when completed 60,000 cells have been dealt with.

In previous notes I have more than once described the British standard frame, and in order to assist the reader, I am now able to produce photographs. Its dimensions have also been given, and as will be seen in the plates, the top bar from which each frame is suspended in the hive is 3 inches longer than the bottom bar. The extra length at each end of this top bar also gives a good finger hold when lifting out frames or returning them to a hive. On the lugs of this bar the distance pieces or spacers, termed W.B.C. tin ends, are clearly shewn.

All combs, which in the first instance were a clean light colour, whether naturally built or constructed from comb foundation, will in course of time become very dark. This is due to the continual rearing of young bees or brood, for during development the grub or larva in each cell sheds its delicate skin more than once; these skins are left behind, and discolour the comb. By referring to Plate No. IV., it will be seen that the comb is almost black. Also in this plate notice the larger sized drone (male) cells in comparison with the remainder of the comb, from the smaller cells of which have been hatched out several generations of worker bees.

When it is decided by the whole community to raise a queen, a special cell is built for her development, in which she is hatched head downwards. The cell is usually placed in a well-ventilated position, as seen in Plate No. IV.

Having some odd pieces of comb foundation in my possession, and in order to test whether bees would re-arrange the pattern, a shallow frame—Plate No. V.—was inserted into a hive. The comb foundation was purposely fixed into the frame

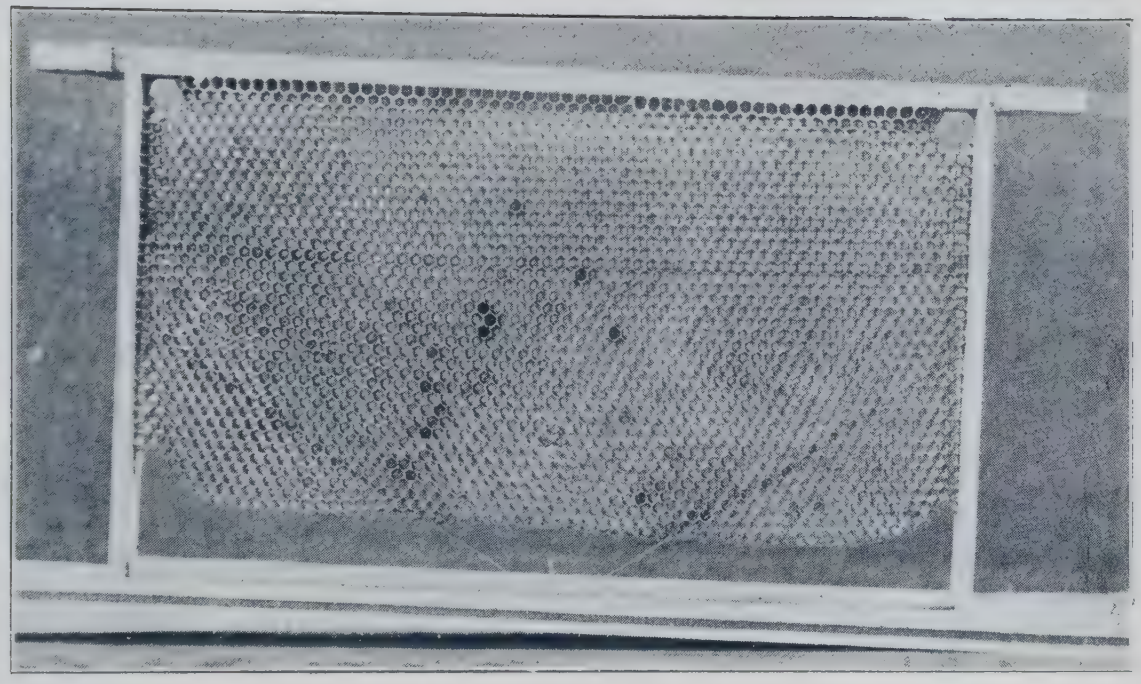


Plate III.—The comb drawn out by the bees. The wire prevents the breaking down of the comb.

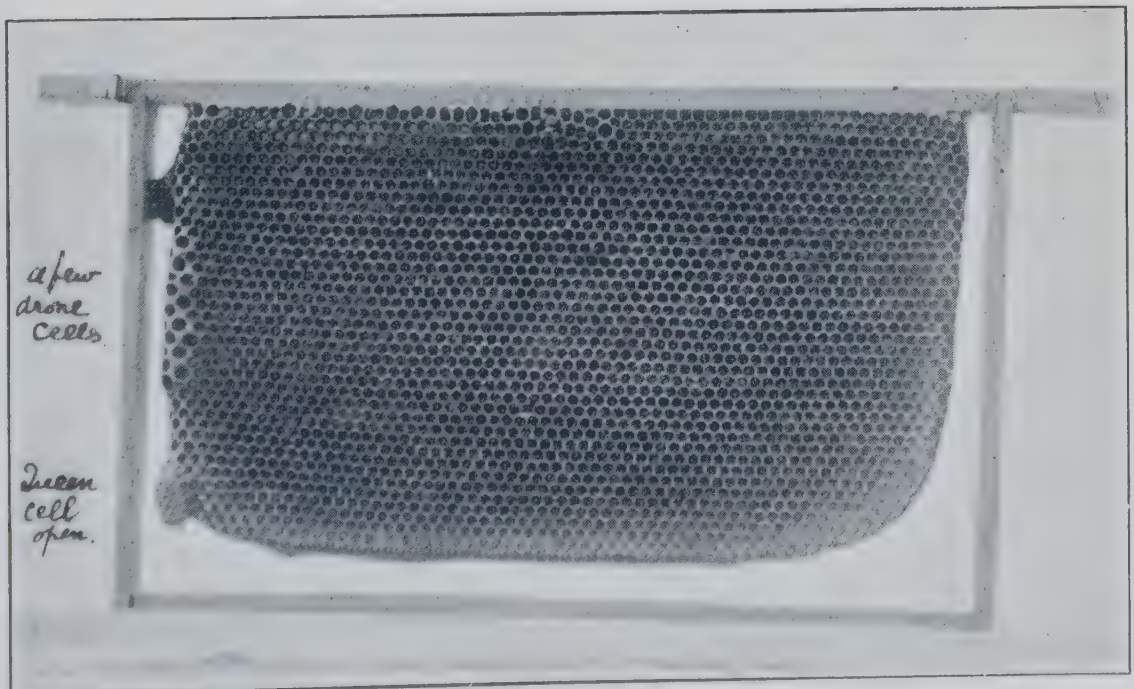


Plate IV.—A comb in which bees have been reared. Notice the queen cell at the bottom left corner from which she has hatched. A few drone cells above it. (Notes in margin—A few drone cells. Queen cell open.)

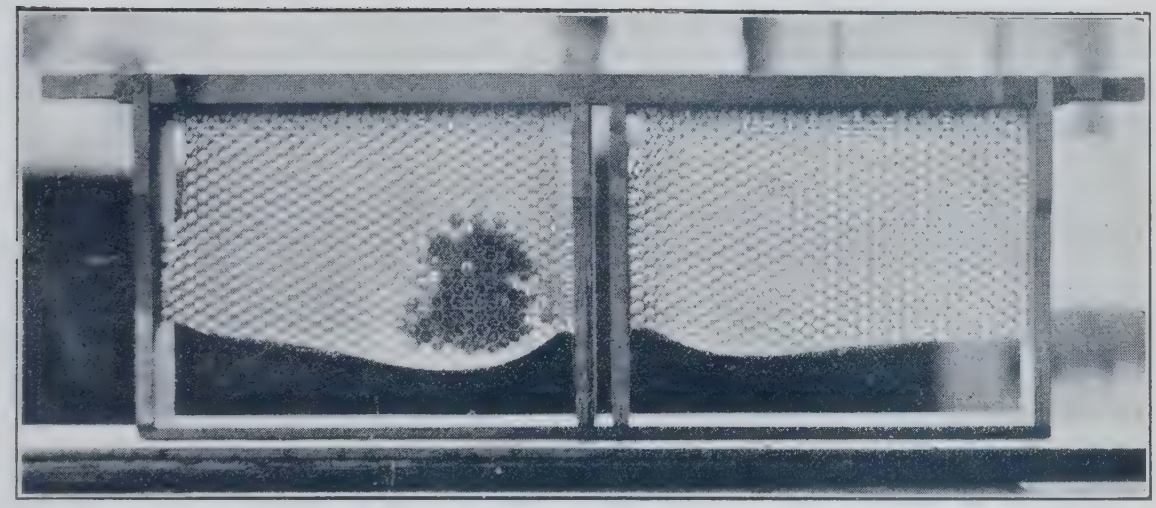


Plate V.—A wide, shallow frame placed in a hive for a short period, shewing foundation fixed incorrectly.

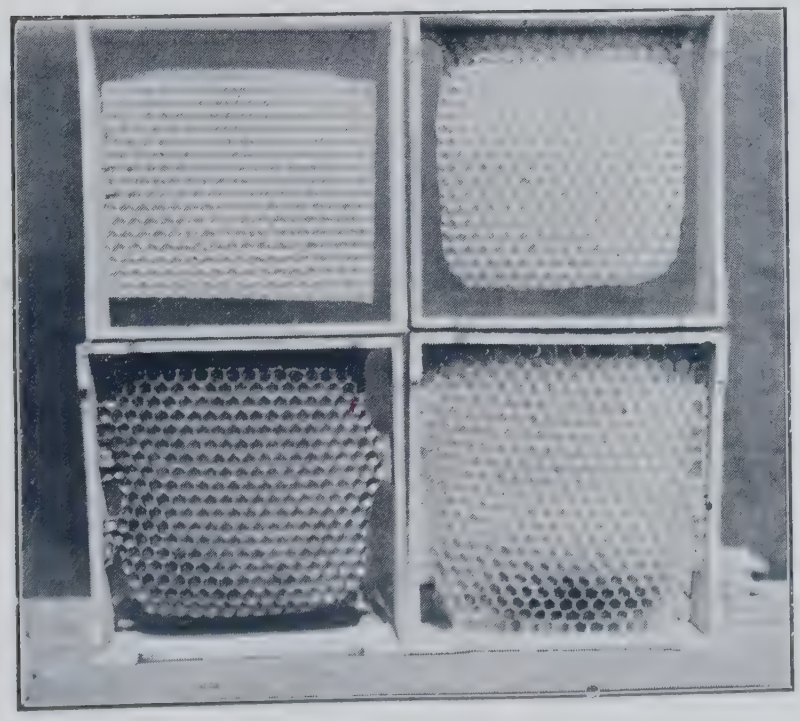


Plate VI.—(1) Top left-hand—A 1 lb. top split section fitted with a full sheet of super foundation. (2) Top right-hand and (3) bottom left-hand—Shewing the gradual progress. (4) Bottom right-hand—A fully drawn out comb into which bees will deposit honey.

the wrong way, for no perpendicular walls are seen. On removing the frame, it was found that the bees had adhered strictly to the pattern given them. In this frame man stepped in to give the bees a start, whereas in Plate No. I. nature commenced operations on her own initiative. The bees have commenced to store honey in the left-hand comb.

The matter at the foot of Plate No. VI. explains it fully.

As the photographs shew step by step some of the work which is accomplished in a hive, they should be of interest to bee-keepers and to those who have not the opportunity to study bees.

Prevention of Poultry Diseases.

By Frank Sheppard.

A thorough knowledge of the prevention and cure of poultry diseases is one of the most important essentials towards successful poultry keeping. The success of each individual poultry keeper depends upon whether he can keep his birds healthy, vigorous and free from disease, and is able to rear strong healthy chicks. The presence of disease amongst the birds not only decimates their numbers, but also greatly arrests the productive activity. Prevention is better than cure, and it is intended in this article to shew briefly how this may be obtained.

There are many individuals who, owing to disease and losses, condemn Rhodesia as a country unsuitable for poultry. This is entirely wrong. After many years' poultry breeding in England and Rhodesia, I am absolutely convinced that there is less disease in Rhodesia than there is at Home, if only the birds are kept under proper conditions and more commonsense is used in their management.

Owing to the fattening nature of our local grains, they are held responsible for a large percentage of the mortality amongst poultry, causing liver disease, etc. It is not the use but the abuse of these grains that causes the trouble. I refer, of course, to mealies, inyouti, kaffir corn, rapoko and sunflower. These are all good poultry foods; they are not the best, but they are good, but must be used on commonsense lines, and consideration given to their fattening nature. The addition of cracked peas or beans to a grain mixture will, of course, greatly improve its feeding qualities and its value as a poultry food, but these crops appear uncertain and are not yet largely grown. For instance, one part crushed mealies, one part invouti and one part dhal gives a ratio of 1 : 5, which

is good. Two parts each of mealies and inyouti and one of dhal gives a ratio of 1 : 5.9. Both of these mixtures I have used for a considerable time with success.

I am a great believer in the use of the products of the country as poultry foods, and if we are self-supporting in this respect, our poultry industry will be conducted on lines more satisfactory and profitable than were we to use imported food stuffs. Oats, wheat and buckwheat are at present grown on such a small scale, and often difficult or impossible to obtain, that they cannot yet be regarded as staple foods. The imported oat is not a suitable food, possessing too much husk and too little body, but it may be used to advantage in small quantities in a grain mixture. The majority of poultry keepers do feed their adult birds entirely on local grains, but in many cases they fail to get the best results out of the food. The reason of this is that the excessive amount of carbo-hydrates in the grains is not worked off by exercise, and, therefore, turns to fat, and perhaps death or disease will result, and certainly egg production will be retarded. Without exercise, food which should be used as fuel, or to repair tissues or in making eggs, will be formed into additional flesh or fat.

As this article is not on foods and feeding, it is impossible to deal with this subject in detail, but the writer will endeavour to explain briefly the uses of carbo-hydrates. Carbo-hydrates are usually called the heat and energy forming foods, and are also used in digesting the albuminoids. It requires $4\frac{1}{2}$ per cent. of carbo-hydrates to digest 1 per cent. of albuminoids. (Do not confuse digestion with assimilation. Digestion is the reduction of the foods to a liquid state, and assimilation is the taking up by the blood of the different nutrients and conveying them to the parts of the body.) All the carbo-hydrates in excess of this amount are consumed in the body to produce heat and energy, and if this is in excess of the amount required by the bird, the surplus is turned to fat, which causes poor egg production, lack of fertility, probably liver disease and death. To prevent this, we must force the birds to exercise, perhaps a little unduly, still it must be done. It is true that this will use up stamina and vitality which would, under normal circumstances and with better feeding, be devoted to egg production; but in Rhodesia, when feeding on local grains,

we must not expect to beat any egg records. We must look to the health of the birds first, and study their wants and requirements, and the eggs will come all right.

To promote exercise when birds are in confinement, the most natural and best means is by providing scratching litter, hay, leaves, etc., in a shaded place, into which the morning feed of grain is thrown. This should be given as early as possible, to make use of the cool part of the day, and will keep the birds occupied and scratching for hours. The means of promoting exercise by suspending green food for the birds to jump and peck at is no doubt highly amusing to the birds and helps to keep them occupied, but it is rather futile as a means of providing exercise. It will provide occupation for them, which is most necessary for birds in confinement, otherwise they may resort to feather eating and other evils. A very good substitute for the suspended green food will be found in dhal. If a small lot is planted in each pen, and protected till matured, the birds will keep it stripped of leaves as far as they can reach by jumping, and the top leaves which they cannot reach will provide shade. It is the writer's experience with small lots of dhal in each pen that many of the birds take some time to realise that it is edible, whilst others take to it immediately. Steeplechasing is not recommended as a suitable form of exercise for poultry in Rhodesia. This is obtained by placing a succession of low jumps round the sides of the pen. The attendant, on entering with the food bucket, is immediately surrounded by the birds. He then commences the circuit of the "course," followed by the birds, which take the low jumps on the way. When sufficient laps have been completed, which will, in his estimation, supply the amount of exercise required by the birds, then the food is distributed.

Birds on free range will not require scratching litter to provide exercise, except in bad weather. During fine weather the grain food should be thrown amongst the grass and small bush in a shaded place. During wet weather it is better, if possible, to provide a sheltered scratching place, especially for moulting birds, which should always be kept as dry as possible.

On cold, frosty mornings, a small feed of soft food first thing will be found beneficial, and then grain food in the scratching litter almost immediately afterwards. This soft

food must be given as soon as the birds are liberated and before the sun is up, otherwise its beneficial effect will be lost. This extra feed will, of course, entail a little more labour, but the attendant will be recompensed not only by the health of the birds, but chiefly by the increased egg yield. After experimenting largely with many systems of feeding in Rhodesia, the writer is firmly convinced that the grain food in the morning and soft food in the afternoon is far the most satisfactory when feeding on the local grains, and when there is a tendency for the birds to become fat and lazy.

To give a practical illustration shewing the beneficial effect this method has over the other, that is, feeding the soft food in the morning and the hard food at night, I cannot do better than quote the notes on the feeding of the birds in the laying contest held at the Harper Adams Agricultural College, Newport, Salop, in 1913-1914. The report of this test gives the following details regarding the system of feeding :—"The method of feeding adopted at the commencement of the test was to feed two meals per day. A soft, warm mash was fed early in the morning, and grain food in the afternoon inside the house in litter. Under this method the birds did not take sufficient exercise, the tendency being to stand about after the morning feed of wet mash. This method was changed to three meals per day. The morning feed consisted of warm mash, only in less quantities, followed almost immediately by grain food given in the litter. The third feed was given in the afternoon as before. The change was so obviously beneficial, the birds appearing so much healthier, brighter and more active, that the feeding was entirely reversed—one feed of grain being given in the morning and one of warm mash in the afternoon. This gave better results than either of the former methods, and was, therefore, adhered to throughout the test. It was considered essential to keep the birds as busy scratching as possible, and by this method of feeding the maximum amount of scratching was obtained." In the report of the health and disease of the birds, we find :—"... Many other birds shewed considerable tendency to become liverish, but improved considerably when the grain food was given in the morning and mash in the afternoon."

In the following test, 1913-14, the feeding methods em-

ployed were as follows :—"The first feed in the morning consisted of hard grain; if the weather looked like turning in wet, soft food was fed about noon and corn in the afternoon. otherwise the mid-day meal consisted of grain, and the last feed in the afternoon of mash. In summer the meal at noon was omitted." In the report of the health of the birds in this test, no mention is made of liver troubles.

An abundant supply of green food is necessary to ensure healthy birds. Green food to fowls is much as fruit is to human beings, toning and correcting the internal organs. Its use is also a great preventive of the dangers of over-feeding and the many forms of liver troubles. The supply of green food should be regular, if possible, as, if the amount fluctuates, there is a possibility of bowel troubles, and the upsetting of the digestive organs.

In dealing with the subject of food, it is necessary to include water, grit, shell-forming material and charcoal. Clean fresh water must always be before the birds. Soft water is most suitable. Fresh water should be given at least twice daily, and the drinking vessels thoroughly cleansed once, and scalded when necessary. They must be placed out of the sun, as water exposed to the sun's rays loses its freshness and satisfying qualities. If fowls drink too little, there will not be enough to moisten the food to ensure proper digestion, and if they drink to excess, there is always the possibility of internal troubles.

Grit must also be supplied. A short supply of grit will bring on liver troubles, and if withheld altogether will cause other ailments. Broken glass and crockery are not suitable as substitutes. The former will probably perforate the crop or other internal organs, and the lead used in the manufacture of the latter is poisonous. Grit must on no account be mixed with the soft food, but should be placed in some convenient position so that the birds can help themselves.

Shell-forming material is also necessary. This is obtained in small quantities from the vegetable and grain food, but the proportion is so small, even when birds are running on a free range, that a further supply should be given. Ground shells or slaked lime will be found suitable; these, as with the grit,

must not be mixed with the soft food, but the birds must be allowed to help themselves.

The use of charcoal is also of great assistance in maintaining healthy birds. It may either be finely ground and mixed in with the soft food, or ground small and fed as the grit and shell. If fed in the soft mash, about one pound of charcoal to every hundred pounds of mash will be about the right proportion. Charcoal assists in purifying the blood, and absorbs the noxious gases generated in the digestive organs, and neutralises their effect. If it is given to excess in the mash, the droppings will be found to be hard and dry, and often streaked with blood.

Whether birds are kept in confinement or on free range, they must be provided with abundance of shade, and must not be forced to crowd under the shaded side of the house to seek shelter from the sun.

The above remarks deal principally with the prevention of diseases caused through improper feeding—indigestion, crop and liver troubles, diarrhœa and others. For the prevention of colds, roup, catarrh, bronchitis, pneumonia, etc., we must look chiefly to the housing.

Many of the farmers' flocks are housed under ideal conditions, but there are others, and far too many of them. Some of the farmers' poultry houses that I have seen in the Sinoia and Eldorado districts could not be improved upon. Light, fresh air without draught, cleanliness and absolute protection from rain and damp have been thoroughly understood, and the excellent health of the birds and high egg yield clearly proved the value of good housing. In the Salisbury district also I have seen birds housed under excellent conditions, and for their little trouble and expense, the owners have been well repaid. Amongst town and suburban poultry keepers many useful houses are to be seen, but in far too many cases are the houses not only damp, but every effort appears to have been made to exclude fresh air and sunshine, the poultry keepers' best and cheapest disinfectants. Grass and pole and dagga must be condemned as material for the construction of poultry houses. They are usually damp, difficult to keep clean, and harbour vermin. Iron or brick houses only should be used,

and as little timber as possible. Personally, I much prefer iron houses, as they are easily moved, and more suitable in many other ways. Open fronted houses should be used, and any ventilators at the sides or back must be well above the heads of the birds while perching. The roof must be water-tight, and some protection must be fixed to prevent the rain driving in through the front. This, whether of iron, grass or stout canvas, need only be fixed during the wet weather. The houses should be placed with their backs to the prevailing wind, in most districts S.E., and if so placed, they will get the full benefit of the late afternoon and evening sun.

Cold has little or no effect on the health of fowls, though it retards egg production, but they cannot withstand damp and draughts, which are the chief causes of catarrh, roup and similar ailments. Again, the sudden change of temperature and climatic conditions from the intense heat of October to the rains in November is one of the chief causes of pneumonia, through which so many badly housed birds die in the early part of the wet season. Young stock, in particular, which has not reached the perching stage, must be provided with dry sleeping quarters, and, if possible, boarded floors, as sleeping on damp bedding or litter will bring on cramp, rheumatism and other troubles. The boarded floors also greatly assist in keeping the birds free from sand fleas.

As regards housing room and accommodation to avoid over-crowding, with open fronted houses you can pack in as many birds as you have perching room for. Allow plenty of head room and eight inches of perching room for each bird—the back perch one foot six inches from the back of the house, the perches at least one foot apart, and the front one two feet from the front of the house. If this is done, there need be no fear of the birds over-crowding, or of the houses becoming hot and unhealthy during the night. How hot an iron house becomes during the day does not matter in the slightest, as the birds are not in it. The perches should not be more than one foot six inches above the ground, especially with heavy breeds, as jumping from high perches is often the cause of bumble foot. The perches must be all the same level, as if they are fixed one above the other towards the back of the house, the birds will crowd on to the highest one, as it is their

nature to roost as far from danger as possible. Over-crowding must always be avoided, especially with growing chicks. Hot and over-crowded brooders and chick houses will not only stunt their growth, but their constitution will be lowered, and they will be unable to resist any disease there may be about. Also contagious diseases spread very rapidly amongst birds crowded in their sleeping quarters, and if they are allowed to become over-heated during the night, they cannot withstand the sudden cold when liberated in the early morning.

The excessive use of tonics and spices is the cause of many failures. Green food and grit are the only two tonics required regularly, but a dose of Epsom salts should be given once a week in the drinking water. One ounce of salts to each gallon of water will be enough. Lettuce and onions are two excellent tonics in themselves, and if the latter is chopped up in the soft food during wet weather, it is a grand preventive of cold.

The neglect to place in quarantine all fresh arrivals, is frequently the cause of introducing disease and vermin into a healthy flock of birds. Unless you are confident that a new arrival is free from disease and vermin, it should be thoroughly examined and isolated for several days before being allowed to run with other birds.

It is hardly necessary to point out the necessity of absolute cleanliness of everything connected with poultry. All houses, runs, perches, nest boxes, water and food vessels, brooders, coops, training and hospital pens, etc., must receive constant attention.

Finally, after you have looked to your housing and feeding methods, with the view to preventing disease as much as possible, you must look to the birds themselves and your system of breeding. You must keep up the vitality and stamina of the birds. Disease always attacks the weakest members of the flock, and many of the diseases caused by micro-organisms would never have been discovered were it not that the vitality and stamina of the birds were so low that they were unable to resist the attacks of the microbes. Select your breeding stock. In-breeding will not lower the stamina of your birds, if it is done on proper lines, but if you in-and-in-

breed from absolute rubbish, then you must look out for trouble in the future.

Where a large number of birds are kept, it is, of course, impossible to keep absolutely free from disease year in and year out, but with proper care, attention and precaution, the probability is reduced to a minimum. Also there must be taken into account the great waste of time, trouble and expense in attending to sick and unhealthy birds. Fowls are by nature extremely hardy ; and if only they are given a chance, and treated on commonsense lines, they will readily prove their great powers of resisting disease.

It has not been intended in this article to deal in any way with the cause, cure and treatment of diseases. These subjects, external parasites, and the necessity of the all-important dust-bath, will be dealt with at some future date.

Correspondence.

BEEF FEEDING EXPERIMENT No. 2.

The following letter has been received from Mr. H. D. Rawson criticising Mr. Simmons' recent article entitled "Beef Feeding Experiment No. 2." We welcome criticism, and publish the letter without delay, but owing to absence from headquarters, Mr. Simmons is unable to give it attention in this issue. We propose to publish his reply in the next *Journal*, together with the results of further cattle fattening experiments now in progress.

To the Editor,

Rhodesia Agricultural Journal.

Sir,—Let me first say that such experiments are not only useful, but absolutely necessary in a young country like Rhodesia, and the Government experts are the proper persons to conduct them. However, the results of such experiments must be given in far greater detail, and more carefully audited, if the farmers are to gain any material benefits from them; in fact, I will go further and say that they may do more harm than good, as a new-comer might be deluded into thinking them a profitable way of starting farming.

Firstly, I am of opinion (and so is every farmer I have spoken to on the subject) that the values put on the feeds are too low. It is only a favoured few who can produce crushed maize at 3s. 6d. per bag. I recollect a discussion a short time ago at a farmers' association meeting (I think Makwiro) where the cost of producing maize was made out to be double the figure you take, and I certainly think that the Government

Experiment Farm, Gwebi, cannot be one of the cheapest growers of maize in Rhodesia, more especially as it is purely an experiment farm, and does not go in for large acreages. Ground nuts at 4s. 6d. per 100 lbs. works out at roughly 3s. 6d. per bag, which is lower than any cost I have ever heard of before. No wonder the B.S.A. Co.'s Oil Factory think 7s. 2d. per bag a handsome price to pay us. From general enquiries I find an average of 4s. 6d. per bag to be nearer the cost. With regard to the hays (bar oats) I think your values too low, particularly teff at 12s. 6d. per ton.

Secondly, your experiment discloses an outlay of £180 capital, which you incurred for a period of five months. Why has not an item appeared for interest on capital outlay for these five months and debited to the result of the experiment? In your experiment you say Lot 1, shewing the greatest profit, were shedded and yarded the whole time. Where is the item for interest on capital outlay on these sheds and yards? Lot 2 were grazed during the day within a mile or so of the homestead. Where is the item for herding these animals for five months?

From the figures given in your list for Lot 1, making the most profit, viz., £12 14s. 2d., I make it that you have roughly earned 50 per cent. per annum on your outlay, but I maintain that if no bullocks had been bought at all you could with the greatest of ease have cleared 100 per cent. on the grain, hays, etc. And if you had included such items as I have previously pointed out, your profit would have come down to under 40 per cent. In my opinion, to leave the slightest opening for any farmer to think you have made a greater profit than actually realised, can only be fatal to any good such experiments can do.

I am, etc.,

H. D. RAWSON.

Departmental Correspondence.

Under this heading we publish correspondence between farmers and the technical officers attached to the Department of Agriculture, containing information which may be of interest and assistance to our readers.

"PIP" IN POULTRY.

In reply to a correspondent, Mr. Sheppard writes as follows:—Pip is a hard growth which forms on the tip of a fowl's tongue. It is prevalent at this time of year owing to the number of colds occurring amongst improperly housed birds. When the nostrils become stopped up with mucus, a bird is forced to breathe through the mouth, which causes the tip of the tongue to become hard and discoloured.

Cure.—Do not pick off the tip of the tongue; this is both cruel and quite unnecessary. Anoint the tongue gently a few times with glycerine or glycerine and borax, and the tip will either come off by itself or can be easily removed. A small dose of a cooling medicine should be given, Epsom salts or flowers of sulphur. To guard against further trouble keep the birds free from colds and damp.

The Agricultural Outlook.

The season has opened extremely well. Rain fell in some districts at the end of October, nearly everywhere during the first weeks of November, but at that period the distribution was in many instances somewhat irregular. Since then precipitation has been general and fairly continuous, but with sufficient intervals of sunshine to keep the ground warm and foster the germination of early sown crops. The veld grass has responded quickly, and the effect upon stock has been, as usual, to produce a rapid improvement. One is tempted to hope that we are about to enjoy a spring and summer of the old-fashioned kind, with plenty of rain well spread over the growing season, but the experience of last year forbids us to be too sanguine, for we remember that that also opened full of promise.

Our district reports for the most part came in before the recent rains had thoroughly set in, so that prospects have very much improved since they were received.

A remarkable feature of stock farming in Rhodesia is that at the tail of the dry season every year reports are invariably received to the effect that stock is, of course, in poor condition, but that there is little ordinary disease; mortality is small and losses in calving few. Therefore the Rhodesian climate cannot be very severe on stock, or else our cattle are of an unusually hardy type, or perhaps a little Rhodesian grass goes a long way. Possibly all three statements are true. This does not do away with the other fact that a periodic loss of condition in the live stock of a country is also a periodic dead loss to the stock owners of that country. Whether we consider the injury done to the constitution of the animals, or the decrease of efficiency in working oxen, or the addition to the time for fattening slaughter cattle, the loss is always there. In the last case the time lost must be multiplied by

two, for every month a beast goes back will require at least another month to bring it up to its original condition before it can make further progress. This annual loss can be prevented by being careful that farms are not overstocked, by a system of sub-dividing the pasture, and, lastly, by providing artificial winter feed. In those districts where the conservation of winter feed is practised, the reports as to the condition of stock are more favourable than elsewhere.

Planting generally of maize, tobacco and other summer crops began quite early in November, and is still proceeding. There is reason to believe that large acreages will be sown, and that most crops will get a good start, and if the summer fulfils the promise of spring, bumper crops may be expected.

Veterinary Report.

September.

AFRICAN COAST FEVER.

Salisbury and Mazoe Districts.—No fresh outbreaks, and no cases of disease at any of the infected centres.

Mrewa District.—No fresh outbreaks. Two cases of disease occurred at one of the isolation camps. The cattle concerned are suffering heavily from the shortage of grass and water.

Melsetter District.—No fresh outbreaks. At the Wolverhampton infected centre six cases of Coast Fever occurred during the month.

Gwelo District.—No fresh outbreaks. At the Riverbend infected centre two animals died and three were destroyed. Examination in each case shewed the existence of Coast Fever.

Correction.—During July one case only of Coast Fever occurred at the farm Cross Roads, not two as stated in the report for that month.

EQUINE INFLUENZA.

An outbreak of influenza occurred in Bulawayo and district, affecting 75 per cent. of horses, mules and donkeys.

MALLEIN TEST.

The following animals were tested with mallein on importation, with negative results:—Horses, 30; mules, 45; donkeys, 62.

IMPORTATIONS.

In addition to the above:—Heifers, 38 (32 *ex* United Kingdom); bulls, 41 (4 *ex* United Kingdom); sheep and goats, 1,828.

EXPORTATIONS.

Slaughter cattle to Johannesburg, 1,311 head.

October.

AFRICAN COAST FEVER.

Salisbury, Mazoe and Mrewa Districts.—No fresh outbreaks, and no cases of disease at any of the existing centres of infection.

Melsetter District.—No fresh outbreaks. One case of disease occurred during the month on the farm Rookwood.

Gwelo District.—No fresh outbreaks, and no case of disease at either of the infected centres at Hunter's Road.

CONTAGIOUS ABORTION.

Two fresh centres of infection were dicsovered in the Marandellas district.

MALLEIN TEST.

The following animals were tested with mallein on importation, with negative results:—Horses, 22; mules, 10.

EQUINE INFLUENZA.

This affection has now disappeared from Bulawayo and vicinity.

TUBERCULIN TEST.

One heifer in a consignment from England gave a suspicious re-action to the tuberculin test, and will be re-tested later.

IMPORTATIONS.

Horses, 22; mules, 10; heifers 194 (34 *ex* United Kingdom); bulls, 91 (18 *ex* United Kingdom); sheep and goats, 1,591; pigs, 23.

EXPORTATIONS.

Slaughter cattle to Johannesburg, 1,197. Total to date, 9,900.

J. M. SINCLAIR,
Chief Veterinary Surgeon.

Farming Calendar.

December

BEE-KEEPING.

Honey in good quantities will still be coming in, as the welcome rains will be beneficial to veld blooms. Continue to give room by extracting honey from shallow frames, then return these to be refilled. Extracted honey should be drawn from the machine into the honey ripener, into which it should be strained through several thicknesses of butter muslin, remaining there, to allow surplus water to evaporate, for five days, then draw off from the tap into clear white glass bottles. All bottles must be cleansed thoroughly. See that ventilation is ample on hot days.

CITRUS FRUITS.

Citrus trees can be planted out at any time between October and the end of January. The best time is the end of October or early November, when the ground is warm and trees have hardened up their first growth of season, *i.e.*, spring growth, and are in fit condition to commence second growth, which they will do if transplanted properly at that time—end of October. Citrus trees should not be planted later than the end of January, as the growth they put on after planting later than this is very liable to be still sappy at the approach of winter, and consequently more sensible to the effect of cold. The young trees require to be well watered after planting. The soil around them should never be allowed to be really dry, but, on the other hand, it must not be kept in a state of sogginess. Immediately after planting protect the stems of the young trees from the sun by whitewashing or covering up with grass. Cut the tree down so as to leave a stem of about 2 ft. 6 ins. or 3 ft. long, and form the head of the future tree in the top 8 ins. or 1 ft., according to the best position of the shoots, not more than three or four in number. All other growths to be suppressed whenever they appear. Keep the soil nice and loose by digging, forking or hoeing round the young trees. It will then not be necessary to water them so frequently. The orchard should by this time have been thoroughly ploughed, and any cover crop sown already be up and growing. Don't forget, before the wet season, the first ploughing should be up and down the steepest gradient of the orchard, and be followed immediately after harrowing by cross-ploughing across the hill. This is to obviate as much as possible erosion of the soil during the coming heavy rains. Remember that, if a long spell of dry weather occurs during the so-called wet season, your bearing orange trees will probably require an application of water, otherwise the crop of fruit may receive a check from which it will never properly recover.

CROPS.

This is the month when most of the summer farm crops should be sown. If rains have been early, it is sometimes usual to start planting in the latter half of November. There is, however, less risk attached to December plantings, and as there is no danger of early frosts to interfere with the ripening of the plants, it is best not to start planting too early in the season.

Maize planting should be continued this month. Other circumstances permitting, an effort should be made to have the planting completed by the middle of the month. Light harrowing immediately before and shortly after planting will be of great assistance in securing uniform germination and in keeping down weeds, thus giving the young maize plant a good start.

Sunflower, dhal and peanuts should be sown as early as possible, also velvet beans for seed, as these crops require a full season to attain maturity. Wheat and oats may be sown as summer crops during the whole of this month. Other crops, such as teff grass, linseed, millet, buckwheat, majorda melons, and mangels may be sown at any time during the month. The main crop of potatoes should be put in from the middle of the month onwards.

ENTOMOLOGICAL.

Maize.—Surface beetles may be very injurious if seed is planted in dry soil during December. See "The Dusty Surface Beetle," *Agricultural Journal*, August, 1914. Cutworms and stalk borer are likely to be in evidence. See "Some Insect Pests of Maize," *Agricultural Journal*, June, 1912.

Tobacco.—The newly planted crop is subject to the attack of surface beetles, stem borer, leaf miner, "wireworms," grasshoppers, large crickets, etc. A good deal of protection may be obtained by dipping the tops of the transplants as far as the roots in arsenate of lead 1 lb.—15 galls. water. See "Handbook of Tobacco Culture," published by the Agricultural Department, pp. 71-90.

Potato.—Ladybirds may be injurious to the foliage. See "Two Ladybirds injurious to Potato Plants," *Agricultural Journal*, October, 1913. On sandy soils blue blister beetles may be troublesome. An immediate spraying with arsenate of lead 1 lb.—12 galls. water should give relief.

Cabbage, Turnip, etc.—Webworm and diamond back moth are still the main pests. See "Cabbage Webworm," *Agricultural Journal*, February, 1914. Dusting with paris green and lime will give protection against both pests.

Bean.—Stem maggot may be serious in December, especially if previous crops have been grown for French beans in gardens. See "Bean Stem Maggot," *Agricultural Journal*, April, 1913.

Melon, Marrow, etc.—Leaf-eating beetles frequently destroy the very small plants entirely. Spray with an arsenical wash or cover the young plants.

Deciduous Trees.—Chafer beetles and fruit beetles are commonly very troublesome. See "Chafer Beetles," *Agricultural Journal*, December, 1914.

Fig.—Collect and destroy all fruit infested with fig weevil.

FLOWER GARDEN.

This month is generally showery, and constant stirring of the soil is, therefore, necessary to keep it loose. Seeds of perennials and annuals for February blooms may be sown. Transplanting should be done in the evening on a cloudy day. Carnations should be kept free from dead wood, and climbers attended to.

FORESTRY.

Give the ground the final harrowing, and if the season is a normal one, planting out should commence. This is the ideal month for planting out in a normal season, as the young trees have the benefit of all the summer rains, and become well established before the dry winter months arrive. Plant on dull, rainy days, or failing such days, late in the afternoons.

POULTRY.

Thoroughly clean and overhaul all brooders, coops and chick houses not in use, and store away ready for next season. Do not continue hatching from moulting birds. If possible, pen up separately all the breeding cockerels. Remove the birds from all breeding pens and small runs. Dig over the ground and plant a crop. Dispose of all surplus cocks and old hens.

STOCK.

Cattle.—The veld everywhere is now good, and little trouble in respect of grazing is likely to be experienced. Ranching cattle will require little attention beyond dipping, but any stock that are in poor condition should be kept near home and given a ration of hay and possibly mealies daily. The bulls should be returned to the herd, either at the end of the month or in January, and it should be remembered that the better they are conditioned and fitted for their work the more hope there is of a good crop of calves. For this reason also, every effort should be made to have all female breeding stock in good condition. The dairyman will find that a ration of mealies and hay, and oil cake, if he can afford it, will repay him in spite of the fact that grass is plentiful. The oil cake will be found especially valuable where the production of cream or butter is the object in view. Milch cows should be protected as much as possible from cold rains and hot sun. A lean-to shed, well bedded up, will increase the milk supply, especially in periods of protracted rainfall. The calf pen should be kept clean, dry and sweet, and calves should be kept in in hot or very wet weather. Dip regularly.

Sheep.—Graze on higher lying lands, keep the kraals clean, dry and airy, and watch for ticks.

TOBACCO.

Continue transplanting and cultivating that which has been transplanted. Harrow and cultivate the fields that are to be planted out and have had rain since the last cultivation, so as to have them loose and light for the reception of the plants. Never neglect the tobacco that has been set out to transplant—rather encourage it in every way by cultivation and early fertilisation to grow and come to maturity in 90 to 100 days after transplanting.

VEGETABLE GARDEN.

All vegetable seeds may be planted. All advanced plants should be constantly cultivated. Potatoes should be ridged, and peas, beans and tomatoes staked. This is a good month for planting the main crop of potatoes.

VETERINARY.

Occasional cases of horsesickness may occur during this month. With the great increase in ticks, due to the heat and moisture, cases of redwater and gallsickness may be expected, more especially amongst Colonial stock imported since the last rainy season. The cool weather which frequently follows the early rains is an excellent time for castrating calves and other animals.

WEATHER.

In Mashonaland usually six inches of rain fall this month, and in Matabeleland five inches, but considerable variations occur. Less rain usually falls at this time in extreme southern parts of the country. Very heavy downpours may be looked for, and it is well to be provided by drains and ditches against the effects of heavy rain storms. A dry spell about Christ-

mas time is a very frequent, though not invariable, event in Rhodesia. This partial drought may last only a fortnight or may extend to six weeks; in the latter event often causing some anxiety regarding young crops, especially those not yet through the ground. The best means of meeting this condition of the weather is by frequent surface cultivation by harrow or horse hoe, to preserve a loose soil mulch on the surface and prevent losses of soil moisture by evaporation.

January.

BEE-KEEPING.

Where it is desirous, artificial swarms can now be made, so also can nuclei be formed from proved best working strains. All the above must be stimulated with food. In the cooler districts it will be necessary to contract the entrances and close down for winter.

CITRUS FRUITS.

See under December notes.

CROPS.

Sowings of wheat may be continued up to the middle of this month, and teff grass and buckwheat may be sown up to the end of the month. Planting of main crop of potatoes may be continued, according to the moisture in the soil, up to the end of the month.

ENTOMOLOGICAL.

Maize.—This crop is subject to the attack of stalk borer, black chafer beetle (*Heteronychus*) and white grubs during this month. Information concerning most of these pests may be obtained by reference to "Insect Pests of Maize" in the issue of the *Journal* for June, 1912. Seed planted during this month is liable to suffer from surface beetles. See "The Dusty Surface Beetle," *Agricultural Journal*, August, 1914.

Tobacco.—Most of the pests of this crop are active during January, *e.g.*, stem borer, leaf miner, "wireworms," surface beetles, large crickets, grasshoppers. Tobacco pests are discussed on pp. 71-90 of the "Handbook of Tobacco Culture," published by the Department of Agriculture.

Potato.—Certain ladybirds are apt to defoliate the young potato plants of the main crop, especially on farms where early potatoes are also grown. See *Agricultural Journal*, October, 1913. Blue blister beetles are apt to be injurious on sandy soils, and may be checked by spraying with arsenate of lead 1 lb. to 12 gallons of water. Spraying should be commenced for early blight. See *Agricultural Journal*, August, 1913.

Cabbage Family.—Plants of this family are subject to the attacks of webworm and sawfly in January. See *Agricultural Journal*, February, 1914; April, 1910; April, 1911.

Beans and Cowpeas.—These suffer chiefly from stem maggot. See *Agricultural Journal*, April, 1913. Aphis may be checked by spraying with tobacco wash or paraffin emulsion.

Melon Family.—The chief pests in January are leaf-eating beetles. Spray with an arsenical wash or cover young plants.

Citrus Trees.—The fruit is subject to the attack of citrus codling. Collect and destroy the infested fruit.

Deciduous Fruits.—These are all subject to the attack of fruit-eating beetles. See "Chafer Beetles," *Agricultural Journal*, December, 1914. Fruit moths are injurious during this month, the only preventive measure being to net the trees. For fruit fly remedies, see *Agricultural Journal*, August, 1911.

Fig.—The adult beetles of the fig borer are to be found on the young shoots. They should be destroyed. The grubs in the stems may be killed with a little carbon di-sulphide.

FLOWER GARDEN.

This month requires all one's energy in the flower garden. Annuals may still be sown for late flowering before the season is over. Planting out should be done as early as the weather permits, and advantage taken of a dull day after a shower for this work. If care be exercised much smaller plants may be put out than would at first be thought advisable, as with attention these will make stronger plants than larger ones, which are more likely to receive a check. The soil requires constant stirring, owing to the packing caused by the rains and for the eradication of weeds, which are now very troublesome. All plants should be kept free of dead and decaying matter.

FORESTRY.

If the rains are seasonable, plant out evergreen trees, such as gums, cypress, pines, etc. Fill in all blanks as soon as they are noticed, and do not leave them until the following season. Planting should be done on a wet day, or failing that, on a dull day, or late in the afternoons.

POULTRY.

Provide the pullets with proper houses if eggs are wanted. Moulting birds must be housed in good dry houses if they are to moult out satisfactorily and come on to lay again as soon as possible. Do not miss the evening feed because it is raining. It is better to feed at two or three o'clock, if the weather looks threatening, than not at all. Read notes on treatment of moulting birds in the *Agricultural Journal* of February, 1915.

STOCK.

Cattle.—The recommendations for December apply equally to this month. Ranchers will return the bulls to the herd some time this month, with a view to having the calving season commence in the latter part of September or October.

Sheep.—Continue as recommended for December. If heavy rains have been experienced a few mealies to the ewes will keep them in condition and will often prevent much trouble arising from poverty and anæmia. Those who favour autumn lambs should remember that it will be necessary to put the ram with the flock again in February, and should make arrangements in time. In this connection, a little extra feed, as recommended above, will help to fit the ewes for mating, and will often bring the flock into season more or less together, and will then avoid a prolonged lambing season.

TOBACCO.

Cultivation should continue, and all small and weak looking plants should have special attention, so as to bring them to maturity with the rest

of the field. In most districts in Rhodesia the early planted tobacco is the best; if there has been sufficient rain to allow of the whole crop being transplanted by the end of December or 15th of January, so much the better, and unless the rain is very late, in which case we look for a late season, it is better to stop after the 15th of January, even though the full crop has not been set out. The flue barns should be looked after, and got in readiness for the curing season.

VEGETABLE GARDEN.

Turnips, carrots, cabbage, lettuce, etc., may be sown for carrying on during the winter months. Potatoes may be planted this month for keeping through the winter. Weeding and cultivating between the rows should be continually carried on.

VETERINARY.

Horsesickness may now be expected, especially in districts where early heavy rains have occurred. Blue tongue in sheep will also be prevalent.

WEATHER.

Heavy rain is to be looked for, and during this month we may normally expect nine to twelve inches on the eastern border, seven-and-a-half in the north, and less as one travels westwards or southwards. At this time of year the rainfall tends to be heavier in the eastern than in the western portions of the Territory, whilst prolonged steady rains take the place of the thunder showers which marked the earlier part of the wet season. The growing period is at its height, and high temperatures are registered.

Weather Bureau.

EVAPORATION, CLEVELAND RESERVOIR, SALISBURY.

Year.	Month.	Monthly Evaporation. Inches.	Daily Maximum. Inches.	Daily Minimum. Inches.	Daily Mean. Inches.
1916	September	9·74	0·40	0·19	0·32
1916	October ...	12·17	0·53	0·27	0·39

TEMPERATURES.

Station	September		October	
	Mean Max.	Mean Min.	Mean Max.	Mean Min.
MASHONALAND—				
Charter—				
Enkeldoorn	83·3	47·5	88·54	53·61
Hartley—				
Gatooma	88·96	54·6	96·29	63·93
Hallingbury Farm	83·74	50·0	91·1	57 3
Hartley Hospital	89·2	51·3	95·4	58·9
Idaho Farm	—	—	93·33	55·11
Lomagundi—				
Eldorado Mine	85·73	51·77	90·52	61·90
Kanyemba	84·13	66·33	103·4	75·90
Sinoia	87·16	67·43	92·29	73·26
Sipolilo	85·93	56·13	93·45	63·32
Makoni—				
York Farm	—	—	79·64	—
Mangwendi—				
Kwenda Hospital	79·81	58·0	—	—
Mazoe—				
Shamva Mine	84·8	56·7	90·64	64·24
Melsetter—				
Melsetter	76·62	49·98	83·6	55·6
Mount Selinda	77·76	51·56	82·29	57·41
Vermont	84·99	52·42	84·97	54·31
Salisbury—				
Chishawasha	84·16	47·32	88·6	53·3
Salisbury (Gaol)	85·42	49·75	—	—
Umtali—				
Chiconga's Location ...	82·63	54·12	87·38	59·88
Public School	83·28	53·89	88·44	58·43
Summerfield	68·9	58·26	74·17	65·80
Victoria—				
Eythorne	83·33	49·09	90·29	57·22
Morgenster	80·12	56·9	—	—
Victoria	86·95	58·5	83·13	49·66

TEMPERATURES—*(Continued).*

Station	September		October	
	Mean Max.	Mean Min.	Mean Max.	Mean Min.
MATABELELAND—				
Bulalima—				
Plumtree School	85·38	53·45	91·3	57·4
The Retreat	91·9	—	98·18	—
Bulawayo—				
Essexvale	87·6	49·5	91·19	58·5
Holly's Hope	87·22	52·03	92·70	60·63
Hope Fountain	—	—	—	—
Observatory	82·24	53·07	—	—
Rhodes Matopo Park ...	89·23	55·83	94·0	60·9
Gwanda—				
Antelope Mine	88·00	58·10	93·26	64·33
Gwelo—				
Gwelo (Gaol)	84·03	43·2	86·98	49·64
Hagley (Iron Mine Hill) ...	82·82	49·15	88·87	55·42
Mangwe—				
Empandeni	88·14	52·22	94·92	60·59
Garth	86·06	53·57	82·84	61·18
Tuli—				
Mazunga	91·2	54·8	96·5	62·0
Tuli	95·13	57·06	97·16	65·32
Wankie—				
Victoria Falls	91·2	39·6	98·87	47·67
Wankie (Hospital)	78·31	63·73	102·74	72·67

RAINFALL.

Station	September	October
MASHONALAND—		
Charter—		
Buhera	0·11	2·43
Bushy Park	—	0·16
Enkeldoorn	0·36	0·32
Marshbrook	0·26	0·95
Range	0·51	0·37
Riversdale	Nil	—
Spitzkop	—	—
Umniati	0·10	Nil
Vrede	0·10	
Chibi—		
Chibi	Nil	1·76
Nuanetsi Ranche	,,	1·66
Wylde Grove	0·03	0·73
Chilimanzi—		
Central Estates	0·01	0·05
Chilimanzi	0·39	0·50
Driefontein	0·20	0·33

RAINFALL—*(Continued).*

Station	September	October
MASHONALAND—(Continued)		
Chilimanzi—continued		
Induna Farm	Nil	0·46
Orton's Drift	,,	0·46
Umvuma (Railway)	,,	0·06
Darwin—		
Mount Darwin	0·58	Nil
Gutu—		
Eagle's Nest Ranche	1·95	0·72
Gokomere	0·65	1·24
Gutu	Nil	2·44
Hartley—		
Ardgowan	0·02	Nil
Auchter Leny	Nil	0·02
Battlefields (Railway)	,,	0·07
Carnock Farm	0 25	0·05
Clifton Farm	0·10	Nil
Elephant Hill, Battlefields	—	—
Elvington	0·13	Nil
Gadzema (Railway)	Nil	0·14
Garthnor	0·02	0·77
Gatooma	0·45	0·15
Gatooma (Railway)	0·44	0·07
Gowerlands	Nil	Nil
Hallingbury Farm	0·24	,,
Hartley Hospital	Nil	0·07
Hartley (Railway)	,,	0·17
Hopewell	0·03	0·09
Idaho Farm	—	0·11
"Jenkinstown"	Nil	0·83
Makwiro (Railway)	0·42	0·20
Philiphaugh	Nil	1·96
Shagari	0·03	0·09
Spitzkop	—	—
"Stoneygate"	0·10	0·46
Inyanga—		
Inyanga	0·10	0·50
St. Trias' Hill	1·04	0·33
Lomagundi—		
Argyle	0·35	0·43
Banket Junction (Railway)	0·75	Nil
Darwendale	0·11	0·01
Duxbury Farm	0·62	Nil
Eldorado (Railway)	1·03	,,
Eldorado Mine	0·88	,,
Golden Kopje Mine	0·03	0·09
Kanyemba	Nil	Nil
Lion's Den	—	0·26
Lone Cow Estate	Nil	0·36
Longmead	0·23	Nil
Palm Tree Farm	0·80	0·09
Sinoia (Railway)	0·75	Nil
Sinoia	0·83	0·05
Sipolilo	0·46	Nil
Umvukwe Ranche	0·55	—

RAINFALL—(*Continued*).

Station	September	October
MASHONALAND—(Continued)		
Makoni—		
Chimbi Source	—	Nil
Eagle's Nest	Nil	0·07
Ellavale	0·06	—
Farm Carlow	—	—
Gorubi Springs	0·02	0·21
Mona	0·22	Nil
Monte Cassino Mission	Nil	,,
Odzi (Railway)	,,	0·45
Rusape (Railway)	0·56	0·03
Springs	1·37	0·08
York Farm	—	0·05
Mangwendi—		
Bonongwe	0·44	0·50
Huish Estate	0·29	0·20
Kwenda Mission	0·32	—
Land Settlement Farm	0·90	Nil
Macheke (Railway)	Nil	,,
Marandellas	—	—
Marandellas (Railway)	1·18	1·30
Nelson	0·41	Nil
Selous Nek	1·30	0·06
Theydon	Nil	0·10
Tweedjan	0·95	Nil
Verdoy	Nil	0·68
Mazoe—		
Avonduur	0·47	0·17
Bindura	0·55	0·83
Bindura (Railway)	0·50	—
Ceres	Nil	0·24
Chipoli	,,	Nil
Citrus Estate	0·16	0·05
Dunmaglas	Nil	—
Jumbo (Railway)	0·23	Nil
Kilmuir	0·54	0·78
Kingston	—	0·14
Laguaha	0·18	Nil
Lowdale	—	—
Mazoe	Nil	Nil
Mguta Valley	—	—
Omeath	0·65	Nil
Protea Farm	0·67	0·07
Ruia	1·54	0·08
Ruoko Ranche	0·65	Nil
Shamva	—	—
,, Mine	Nil	0·06
Stanley Kop	0·70	0·07
Sunnyside	Nil	Nil
Teign	,,	0·65
Virginia	,,	0·84
Volynia Ranche	0·30	0·21
Mrewa—		
Glen Somerset	0·11	Nil
Mrewa	0·35	—

RAINFALL *(Continued).*

Station	September	October
MASHONALAND—(Continued)		
Mtoko—		
Makaha	Nil	Nil
Mtoko	,,	0·07
Melsetter—		
Brackenburg	Nil	1·63
Chikore	0·06	1·40
Chipinga	—	—
Helvetia	Nil	0·86
Melsetter	0·16	1·11
Mount Selinda	Nil	2·90
Mutambara Mission	,,	1·27
Pasture	,,	0·09
Tom's Hope	0·51	3·09
Vermont	0·05	1·51
Ndanga—		
Bikita	Nil	1·75
Chingombe	0·04	0·98
Chiredzi Ranche	Nil	0·27
Makorsi River Ranche	0·03	0·60
Marah Ranche	Nil	2·42
Ndanga	0·21	3·75
Pamushana	0·55	2·02
Salisbury—		
Ardbennie	0·18	0·90
Avondale	0·61	1·60
Borrowdale		—
Botanical Experiment Station	—	—
Bromley	0·46	Nil
Brookmead	0·56	0·22
Chishawasha	0·39	0·15
Cleveland Reservoir	0·30	0·31
Forest Nursery	0·45	0·75
Glenara	—	—
Goromonzi	0·17	0·04
Gwebi	0·15	1·40
Hillside	0·21	1·66
Lilfordia	Nil	0·77
Salisbury (Gaol)	1·50	—
,, (Railway)	1·20	0·87
Sebastopol	Nil	0·23
Selby		
Stapleford	—	—
Sunnyside	0·25	1·12
The Meadows	0·46	—
Vamona	0·27	0·48
Westridge	1·04	0·85
Umtali—		
Chiconga's Location	0·08	0·58
Ocean	Nil	0·93
Penhalonga	0·35	2·48
Premier Estate	0·02	0·74
Public School	0·11	1·43
Sarum	0·09	0·32
Stralsrund	Nil	0·97

RAINFALL *(Continued).*

Station	September	October
Mashonaland—(Continued)		
Umtali—continued		
Summerfield	Nil	1·57
Umtali (Railway)	—	—
Utopia	—	1·50
Urungwe—		
Nassau Estate	Nil	0·01
Victoria—		
Brucehame	0·13	2·14
Clipsham	Nil	2·04
Empress Mine	,,	1·01
Eythorne	,,	3·19
Fairburn	0·50	0·47
Fort Victoria (Railway)	—	2·11
Marthadale	Nil	1·73
Morgenster	0·04	—
Silver Oaks	0·01	2·26
Victoria	0·20	2·00
Matabeleland :		
Belingwe—		
Tamba	Nil	—
Wedza	,,	0·20
Bubi—		
Bembesi (Railway)	Nil	Nil
Imbesu Kraal	,,	,,
Inyati	,,	—
Maxim Hill	,,	Nil
Shangani Estates	0·39	—
Bulalima-Mangwe—		
Empandeni	Nil	0·02
Garth	0·02	0·19
Mholi (late Magot)	Nil	0·10
Plumtree School	,,	0·05
The Retreat	,,	0·13
Riverbank Farm	,,	0·04
Solusi Mission	,,	0·08
Syringa	,,	Nil
Tegwani	—	—
Tjompanie	Nil	Nil
Bulawayo—		
Government House	Nil	—
Keendale	,,	0·06
Khami	,,	Nil
Lower Rangemoor	,,	0·05
Observatory	0·12	—
Raylton (Railway)	Nil	0·09
Umgusa	,,	Nil
Umkien	,,	—
Gwanda—		
Antelope Mine	Nil	0·07
Gwanda (Gaol)	,,	Nil
Gwanda (Railway)	,,	0·07
Lamulas	—	Nil
Langalanga	Nil	..

RAINFALL *(Continued)*

Station	September	October
Matabeleland—(Continued)		
Gwanda—continued		
Makalali	Nil	0·62
Manantji	,,	0·48
Mapande	,,	Nil
Mazunga	,,	0·03
Mtshabzi Mission	,,	0·02
Tuli	,,	0·01
West Nicholson (Railway)	,,	Nil
Gwelo—		
Daisyfield	0·04	Nil
Dawn	Nil	0·09
Globe and Phœnix Mine	0·04	Nil
Globe and Phœnix (Railway)	0·05	,,
Gwelo (Gaol)	0·22	0·13
Gwelo (Railway)	0·22	0·17
Hagley	—	0·04
Indiva Farm	—	—
Lalapanzi (Railway)	Nil	Nil
Lovers' Walk	,,	,,
Lower Gwelo	,,	0·07
Oaklands	,,	0·02
Que Que	—	—
Rhodesdale Estate	0·16	0·08
Sikombela Farm	0·18	Nil
Troy	—	—
Woodendhove	Nil	Nil
Insiza—		
Albany	0·08	Nil
Anglo-French Block	—	—
Filabusi	Nil	Nil
Fort Rixon	0·11	0·02
Infiningwe	Nil	0·03
Insiza (Railway)	,,	Nil
Inyezi Farm	—	,,
Orangevale	0·18	0·12
Roodeheuvel	Nil	Nil
Scaleby	—	—
Shangani (Railway)	0·10	Nil
Thornville	Nil	,,
Matobo—		
Holly's Hope	0·01	0·27
Matopo Mission	Nil	0·03
Rhodes Matopo Park	,,	0·02
Nyamandhlovu—		
Gwaai (Railway)	Nil	0·21
Edwaleni	—	—
Impondemi	Nil	
Melinakanda Junction	—	—
Naseby Farm	Nil	Nil
Nyamandhlovu (Railway)	0·09	0·02
Sebungwe—		
Gokwe	—	Nil
Inyoka	Nil	,,

RAINFALL *(Continued).*

Station	September	October
Matabeleland—(Continued)		
Selukwe—		
Hillingdon	Nil	0·34
Selukwe (Railway)	,,	0·04
Tokwe River Ranche	,,	1·99
Umzingwane—		
Balla Balla (Railway)	Nil	Nil
Crombie's	,,	0·04
Essexvale	,,	0·02
Heany Junction (Railway)	,,	Nil
Hope Fountain	—	—
Springs Farm	Nil	0·06
Wankie—		
Bombusi	Nil	0·13
Malindi (Railway)	,,	Nil
Victoria Falls	,,	0·03
Victoria Falls (Railway)	,,	0·03
Wankie Hospital	0·09	Nil
Wankie (Railway)	Nil	,,

— No return.

Dates of Meetings of Farmers' Associations, Southern Rhodesia

(SUBJECT TO ALTERATION)

Name of Association	Place of Meeting	Secretary	1916	1917	
			December	January	February
Beatrice Road	Various farmhouses	H. W. Harris	13	10	14
Bembesi	Queen's Mine Hotel	V. C. Andrews	1	5	2
Bindura	Bindura	A. C. Mills	9	..	10
Bromley	Bromley	A. A. Draper	7	4	1
Charter—Mgezi	Beatrice Mine	W. Krienke	27	31	28
Central	Umvuma	— James	30	27	24
Eastern Border (South Melsetter)	Helvetia	J. T. Jollie	8	12	9
Enterprise	Arcturus Hotel	J. Watson	6	3	7
Felixburg	Felixburg	R. H. Brown	30	27	24
Figtree Branch, R.L. and F.A.	Figtree Hotel	W. H. Robertson	2	..	3
Gatooma	Gatooma	T. J. Golding	16	20	17
Gazaland	Chipinga	W. Wood	30	27	24
Greystone	Roodeheuvel Farm, Shangani	J. W. Spencer	9	13	10
Hartley	Hartley	J. de L. Nimmo	9	..	..
Headlands	Headlands	J. M. Harvard	30	..	24
Hunter's Road Farmers and Stockowners	Hunter's Road Siding	R. H. Twilley	9	13	10
Insiza—Shangani	Shangani	T. E. Penny	2	..	..
Inyazura	Inyazura	A. C. Curling	20	17	21
Iron Mine Hill Proper	Iron Mine Hill	T. Irving	9	13	10
Lalapanzi and Iron Mine Hill	Lalapanzi and Iron Mine Hill	Cyril Allen	9	13	10
Lomagundi	Sinoia	S. R. Garrard	16	20	17
Lydiate	Norton	W. Wrench		No fixed dates	
Macheke	Macheke	J. Cheyne		No fixed dates	
Makwiro	Makwiro	T. R. McLellan	15	19	16
Marandellas and Mangwendi	Marandellas Farmers' Hall	A. Nicholson	2	6	3
Makoni	Rusape	H. Barnes Pope	2	6	3
Marula	Marula Siding	Mac. W. Ingram	23	27	24
Mashonaland	Commercial Hotel, Salisbury	J. Reid Rowland	6	3	7
Matopo Branch, R.L. and F.A.	Sibali	———	..	10	..
Mazoe	Glendale Siding	T. J. Mossop	13	10	14
Melsetter (North)	Various farms	Rev. R. Wodehouse	2	..	..
Midlands	Gwelo	P.O. Box 23, Gwelo	9	13	10
Northern Umtali	Farm "Summerfield"	R. O. H. Blurton	..	..	3
Norton and District	Norton Siding	———	2	6	3
Que Que	Que Que	E. J. Ross	16	20	17
Rhodesian Landowners and Farmers	Library Buildings, Bulawayo	H. S. Hopkins	29	26	23
Shamva	Shamva	A. R. Morkel	..	17	..
Selukwe	Selukwe	F. S. Clark		No fixed dates	
Somabula and Shangani Flats	Weltevrede School	G. B. Botha	..	13	..
Umvukwe	Various ranches	S. A. S. Colborne	9	13	10
Umtali	Christmas Pass Hotel	J. S. Holland	2	6	3
Victoria	Victoria	John Rennie	1	5	2
Vungu	Vungu	J. H. Erasmus	..	..	..
Western	Plumtree Hotel	A. Barclay	9	13	10

Departmental Notices.

Information for Farmers

The Department of Agriculture is prepared to furnish to farmers technical advice either by correspondence, or, where possible, by personal visits. All communications should be addressed in the first instance to the Director of Agriculture.

Crops

The Agricultural Branch deals with enquiries relating to agricultural practice, soils, crops, cultural operations, processes, seeds, trees, farm implements and machinery, etc.

Disposal of Pure Seed.

Farmers devoting special attention to the production of pure seed of any locally grown crops are invited to communicate with the Government Agriculturist, and at the same time to submit a $\frac{1}{4}$ lb. sample of any seed which they may have for disposal.

In addition to indicating the total amount of seed offered and the price f.o.r. the nearest railway station or siding, the correct name of the variety and the origin of the seed from which the crop was grown should be given. In the case of special attention having been devoted to seed selection, the methods employed should be described.

Where these stipulations are complied with, and the samples forwarded are deemed by the Agriculturist of sufficiently high quality for seed purposes, growers and intending purchasers will be put in touch with one another. It is hoped by this means to encourage the production of pure seed, and growers are urged whenever possible to sell their seed under guarantee of trueness to name, type and sample deposited with the Department.

After placing growers and would-be purchasers in touch with one another, the Department can accept no further responsibility except in the position of adjudicator when bulk supplies are thought inferior to sample and description, in which case both parties will be required to abide by the decision of the Department.

For further particulars see article on Pure Seed Supply, *Rhodesia Agricultural Journal*, February, 1914.

Farm Seeds

The only seeds still available for sale from this Department are the following:—

Dhal, 2d. per lb., 15s. per 100 lbs.
Black Sunflower Seed, 2d. per lb., 15s. per 100 lbs.
Feterita and Texas Red Kaffir Corn, 15s. per 100 lbs.
Velvet Bean Seeds, 25s. per 100 lbs.
Napier's Fodder Roots, 3s. per 100, £1 per 1,000.

On account of the limited supply of seed available in some cases, it is impossible to guarantee the full delivery of any order. Farmers are therefore requested not to enclose cheques until they are advised as to the amount of seed allotted to them. The seeds are consigned carriage forward in the case of stations. In the case of sidings the amount of railage should be added.

Co-operative Seed Distribution

The following seeds of summer crops are offered f.o.r. Salisbury for trial under the usual terms of co-operative experiments. The experimenter is required at the close of the season to forward to the Agricultural Department, on forms supplied for that purpose, an accurate report of the result of his experiments.

Seed is supplied in sufficient quantity to sow from $\frac{1}{4}$ to 1 acre according to variety, and not more than four varieties

can be sent to any one applicant. All applications, together with full particulars regarding forwarding, should be addressed to the Government Agriculturist, Department of Agriculture, Salisbury.

Owing to the delay in the arrival of certain seeds, such as Mangels, Beet, Carrots, Radish, Kale and Burnet, from Europe, orders containing these items have been held back for some time. Unless these arrive soon the orders will be forwarded minus these items, which will be sent later when they are received.

1. *Summer Cereals.*—Burt and Smyrna Oats. (Seed of wheat, rice and New Zealand Oats exhausted.)

2. *Oil Seeds.*—Linseed, Castor Oil, annual and perennial, and Sunflower, black Russian. (Ground-nut varieties exhausted.)

3. *Leguminous Crops.*—Velvet Beans and Dhal. (Cow Peas exhausted.)

4. *Hay Crops.*—German Millet, Boer Manna and Teff Grass. (All exhausted.)

5. *Root Crops.*—Mangel, Carrots and Cattle Radish.

6. *Fibre Crops.*—Hemp, Jute, Mauritius Hemp, Ramie and Sunn Hemp.

7. *Miscellaneous Crops.*—Japanese Buckwheat, Majorda Melon, Rape and Cattle Kale.

8. *Pasture Plants and Grasses.*—Napier's Fodder slips, Paspalum, Sheep's Burnet and Beggar Weed (legume).

Forestry—Sale of Trees

The undermentioned varieties of trees will be available for sale from December onwards.

Price, f.o.r. Salisbury, 1d. each, 8s. 4d. per 100.

The following reductions are made on large orders on condition that the tins are returned. Otherwise they will be charged up at 3d. per tin:—

£3 per 1,000. £2 10s. per 1,000 for orders of over 5,000.

Average height of trees—3 to 9 inches.
Average number in tin—25.
Average weight of tin—25 lbs.

Belhambra.
Callitris calcarata—Cypress pine.
do. robusta—Murray pine.
Casuarina leptoclada—Beefwood.
Cedrela toona—Toona.
Cupressus arizonica.
do. sempervirens, var. pyramidalis—Churchyard cypress.
do. sempervirens, var. horizontalis — Common cypress.
do. torulosa—Himalayan cypress.
Dalbergia sissoo—Sissoo.
Eucalyptus amygdalina—Peppermint gum.
do. botryoides.
do. calophylla—White flowering gum.
do. citriodora—Lemon-scented gum.
do. corynocalyx—Sugar gum.
do. crebra—Ironbark.
do. leucoxylon.
do. longifolia.
do. melliodora—Grey box gum.
do. microtheca—Coolibah gum.
do. paniculata—Ironbark.
do. robusta.
do. rostrata—Red gum.
do. saligna.
do. salmonophloia.
do. maculata.
do. siderophloia.
do. sieberiana.
Jacaranda.
Pinus longifolia—Chir pine.
Tristania conferta.
Thuya orientalis—Arbor vitæ.
Dodonea viscosa.
Grevillea robusta—Silky oak.
Schinus molle—Pepper tree.

The following larger trees are available at 3d. each; average height of trees, 9 inches to 2 feet 6 inches; average weight of tins, 25 lbs.; number in tin, 4:—

Callitris calcarata.
,, robusta.
Casuarina leptoclado.
Cedrela toona.
Cupressus torulosa.
Eucalyptus botryoides.
,, microtheca.
,, paniculata.
,, robusta.
,, rostrata.
,, saligna.
Jacaranda.
Thuya orientalis.
Croton sylvaticus.
Weeping willow.
Grevillea robusta.
Schinus molle.
Lagonaria.

Fourcroya gigantea (Mauritius hemp), 1s. per 100.
Agave sisilana (Sisal hemp), 3s. per 100.
Paspalum, 5s. per 1,000 rooted slips.

Shrubs for Sale

Price, f.o.r. Salisbury, 6d. each. There is no guarantee to have any particular variety of shrub in stock, but everything possible will be done to supply the demand. Most of them are planted four in a tin, but there is usually a fair stock of single tins.

Red.	Approx. height of growth.
Holmskioldia	8 ft.
Habrothamnos	5 ft.
Hibiscus, single	8 ft.
do. double	8 ft.
Bottle brush	10 ft.
Russellia	3 ft.

	Approx. height of growth.
Pomegranate	8 ft.
Bauhinia	8 ft.
Euphorbia jacquiniflora	4 ft.
Plumieria (Frangipane)	8 ft.
Bougainvillea	
Poinsettia	

Pink.

Salvia	3 ft.
Lagerstrœmia flosregina	10 ft.
Sensitive plant	1 ft.
Rhodesian mallow (Dombeya)	10 ft.

Blue.

Iochroma lanceolatum	10 ft.
Duranta	10 ft.
Plumbago	3 ft.
Heliotrope	3 ft.
Buddleia	6 ft.
Rhodesian tree lobelia	3 ft.
do. lupin	6 ft.

White.

Spirea (Cape May)	4 ft.
Duranta	10 ft.
Althea, single—"Xmas rose"	5 ft.
Gardenia	4 ft.
Plumbago	3 ft.
Bauhinia (white and mauve)	8 ft.
Deutzia	5 ft.
Plumieria—Frangipane	8 ft.
Pittosporum undulatum	7 ft.
Lemon-scented verbena	5 ft.

Yellow.

Tecoma Smithii	10 ft.
Thevetia nerifolia	6 ft.
Cape jasmine	10 ft.
do. laburnum	10 ft.
Holmskioldia	10 ft.
Buddleia	10 ft.

	Approx. height of growth.
Alamanda nerifolia	4 ft.
Streptosolon Jamesonii	3 ft.
Abutilon—"Chinese lantern"	8 ft.
do. —variegated leaf	8 ft.
Poinsettia	8 ft.
Hypericum—St. John's Wurt	4 ft.
Acacia cultriformis	

Mauve.

Iochroma	10 ft.
Salvia	2 ft.

Climbers.

Golden shower—Yellow.
Clitoria ternata—mussel shell creeper—Blue.
Potato creeper (Solanum Wenlandii)—Blue.
Phaseolus caracalla—White.
Jasmine—White.
Podranea—Zimbabwe creeper—Pink.
Dutchman's pipe (Aristolochia sypho).
Jasmine—sweet-scented—White.
do. double—Yellow.
Ivy.

Hedge plants at 1d. each, 25 in tin.
Bottle brush.

Applications together with remittances and full particulars regarding forwarding should be addressed to the Government Agriculturist and Botanist, Department of Agriculture, Salisbury.

Poisonous Plants

It is of great importance that as soon as possible a study should be made of those plants found in Southern Rhodesia which are poisonous or deleterious to small or large stock. Farmers and others who have known, or suspected poisonous plants on their property, are requested to communicate with the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, at the same time forwarding specimens of the plant, including stem, leaves, flowers, and, where pos-

sible, fruit. Any particular regarding the habits of the plant will be welcomed, and in return the Department will supply all available information regarding the plants.

Live Stock

The Animal Industry Branch is prepared to advise with regard to all matters connected with stock breeding, selection, feeding and registration of stud animals, the dairy industry, poultry management, farm buildings for stock, and kindred subjects. Buyers and sellers of stud stock in Rhodesia are also put in touch with one another.

Entomology

The Government Entomologist advises on matters connected with insect pests of live stock, crops, and fruit trees, and also undertakes the inspection of nurseries and of the importation of plants from abroad.

Chemical Analyses

The Government Agricultural Chemist deals with matters relating to the composition of soils, fertilisers, farm produce of vegetable or animal origin; also the investigation of poisons and of articles of potential economic value.

Nominal charges are made, which, while not covering the cost, will help to defray the expense and serve as a proof of good faith. Samples, carriage prepaid, together with full particulars regarding the subject should be addressed to the Agricultural Chemist, Department of Agriculture, Salisbury.

A schedule of charges and directions for taking samples will be furnished on application.

With all analyses, reports will be furnished explanatory of the results and, when possible, advice given as to the nature, properties and value of the material.

No charge will be made for analysis where the material forwarded is considered by the Director of Agriculture and Chemist to be of sufficient general interest.

Citrus Culture

The Government Citrus Adviser advises on all matters connected with the citrus and deciduous fruit industry.

Services of Government Veterinary Surgeons

1. The services of Government Veterinary Surgeons are available to the public, free of charge, for the following purposes only :—

(1) Attending and giving professional advice in connection with the following diseases, viz. :—Anthrax, Contagious abortion, East Coast Fever, Epizootic Lymphangitis, Foot and Mouth Disease, Farcy, Foot-rot, Heartwater, Glanders, Intestinal parasites amongst sheep and goats, Liver Disease, Lungsickness, Osteo Porosis, Malarial Catarrhal Fever (blue tongue), Rabies, Redwater, Rinderpest, Scabies, Sponziekte (quarter evil), Swine Fever, and any other diseases which may in future be scheduled in terms of section 3, sub-section 18 of the "Animals Diseases Consolidation Ordinance, 1906." Attending to cases of disease amongst live stock which, though not of a contagious or infectious character, may be of general public importance.

(2) Applying tests in regard to Glanders, Tuberculosis, or any other disease against the introduction or spread of which tests are applied under regulations.

(3) Inoculations against the following diseases :—

Horsesickness, Lungsickness, Anthrax, Quarter Evil, Redwater, Malarial Catarrhal Fever (blue tongue). A fee to cover the cost of serum and virus will be charged.

2. The following charges shall be made and payable for services rendered by the Government Veterinary Surgeons in other cases, viz. :—

	£	s.	d.
(1) For every professional visit within three miles of his office or residence	0	5	0

	£	s.	d.
(2) For every professional visit beyond such distance	0	10	6
plus an additional charge of 2/6 per hour whilst engaged in such visits or £2/2/0 a day of 24 hours;			
(3) For advice given at the Veterinary Surgeon's office, for each animal, per visit	0	2	6
(4) The following to be charged in addition to visiting fees :—			
a. For every examination as to soundness, each	1	1	0
b. For castration, horses, each	1	1	0
c. For castration, bulls, each	0	5	0
d. For castration, donkeys, each.. ...	0	10	6
e. For parturition cases, mares, each	2	2	0
f. For parturition cases, cows, each..	1	1	0
g. For other operations, according to nature, from 5/- to £2/2/0.			

3. Double the above fees will be payable for services rendered on Sundays, public holidays, and between the hours of 7 p.m. and 7 a.m.

4. Applicants for the services of Government Veterinary Surgeons must at their own cost provide the necessary transport for the conveyance of these officers from, and back to, their residence or nearest railway station.

5. Farmers and owners of stock throughout the country frequently telegraph for a Government Veterinary Surgeon to be sent to attend an animal which has been taken seriously ill. It is rarely possible to comply with these requests at once, as the Veterinary Surgeon may be engaged on duty which he cannot leave, or is at such a distance from where his services are required that he can hardly be expected to arrive in time to be of any service in an urgent case. Hence much valuable time is wasted, the owner of the animal is dissatisfied, and the veterinary staff discredited. To obviate this, in all cases where veterinary advice and assistance are required, the owner should telegraph to "Veteran," Salisbury, with prepaid reply, the nature of the complaint that the animal is suffering from, giving as full and accurate a description of the symptoms as possible. This will enable the Chief Veterinary Surgeon to

telegraph advice at once and state whether he is able to arrange for veterinary attendance on the case or not, and save valuable time, which is always of importance in acute cases.

6. The services of Government Veterinary Surgeons will only be available for private work with the consent of such officers, and when such work does not interfere with their official duties, or when the services of a private practitioner are not available.

7. As the arrangement of allowing Government Veterinary Surgeons to attend to private cases is intended purely for the benefit of farmers and stock-owners who may wish to obtain professional advice, no responsibility whatever will be accepted for any loss of stock, etc., which may result from the negligent treatment or advice, or wilful default, of any Government Veterinary Surgeon.

8. All fees collected in terms of these Regulations are payable to the Treasury through the local Receiver of Revenue.

Irrigation

From the Agricultural Engineer assistance may be obtained by farmers for the following :—

1. In the locating of possible irrigation projects.
2. In the preparation of surveys or plans and for irrigation works, including weirs, dams, furrows, pumping plants, and determining the extent of land which may be brought under irrigation schemes, together with rough estimates of costs.
3. In the supervision of construction and carrying out of projects.
4. In the selection of suitable sites for boring operations.
5. Preparing specifications, etc., regarding pumping plants, windmills, and agricultural machinery.
6. Giving general advice on cognate subjects.

Informal advice of a general character will be given to applicants making enquiry by letter or in person. Any applicant desiring professional assistance likely to occupy more than one day should apply for advice in writing. All applicants should specify clearly the nature of the project on which they

seek advice, and should give full particulars as to the distance and direction of their farms from some well-known centre. Applicants will be required to provide suitable means of transport for the officer concerned during the period devoted to work on the spot; to provide any unskilled labour that may be required; and to provide for any other contingent services. Applications should be addressed to the Director of Agriculture, who will endeavour to arrange visits as far as possible in order of application, but with due regard to situation, in order to obviate unnecessary travelling and delay. The services of the Agricultural Engineer are given free, but in cases demanding prolonged individual attention, or repeated supervision, a charge may be made according to circumstances.

Samples

In connection with enquiries, especially with regard to diseases amongst crops, insect pests, soils, grain and the identification of plants, specimens should, wherever possible, be sent, together with full details. It is found that such parcels are often forwarded without any indication of where they are from or why they were sent and it is difficult in such cases to trace the sender. It is, therefore, requested that persons when forwarding samples for examination, indicate clearly their names and address on the package, so as to enable their requirements to be attended to without delay.

The Analysis of Agricultural Products, Soils, Water, etc.

Scale of Charges.

Arrangements have now been made for the chemical examination of soils, grain and other produce, oil-seeds, milk, water, fertilisers, etc., on behalf of farmers and others by the Chemist attached to the Department of Agriculture. The charges made, while not covering the cost, will help to defray the expense and serve as a proof of good faith. Samples, carriage prepaid, together with full particulars regarding the subject, should be addressed to the Agricultural Chemist, Department of Agriculture, Salisbury.

Schedule of Charges.

	£	s.	d.
1. Partial analysis of a manure or feeding stuff, for each constituent	0	5	0
2. Complete analysis and valuation of a manure or feeding stuff	1	0	0
3. Analysis of agricultural products, *e.g.*, grain, hay, roots, etc.	1	0	0
4. Analysis of water for agricultural purposes, irrigation or drainage	1	5	0
5. Partial analysis of soil to determine fertility and recommendations as to manurial treatment	2	0	0
6. Complete analysis of a soil	3	0	0
7. Milk—determination of total fat and solids ...	0	5	0
do. do. of fat only	0	2	6
do. complete analysis	0	10	0
8. Cream—determination of fat only	0	2	6
do. complete analysis	0	10	0
9. Analysis of cheese	0	10	0
10. Limestone—estimation of percentage of lime	0	5	0
do. complete analysis	1	0	0

Remittances should accompany samples submitted.

No charge will be made where the material forwarded is considered by the Director of Agriculture and Chemist to be of sufficient general interest.

Directions for Taking Samples of Soils.

It is recommended to select four or five spots at least, per acre, taking care that these represent as far as possible the general character of the soil of the field. If the soil of the area to be reported upon presents notable differences, the samples gathered from the different parts must be kept separate.

Having selected a proper spot, pull up the plants growing upon it and remove surface accumulations of decaying leaves, etc., if any. Dig a hole about twelve inches deep and trim one side so as to be smooth and vertical; from the side so prepared remove with the aid of a sharp spade a slice of

uniform thickness—about three or four inches—down to a depth of nine inches. Place the slice on a clean board or cloth and mix thoroughly with similar slices obtained in the same way from other parts of the field area. About six pounds of the mixture are then placed in a clean cloth bag or wooden box. Forward with the sample the following particulars:—

Date of collection, exact location, position (hillside, vlei or flat), peculiarities of soil or sub-soil, behaviour in wet and dry seasons, crops borne, previous manurial treatment, and every circumstance in fact which will throw light on its agricultural qualities.

Directions for Taking Samples of Grains, Produce and Feeding Stuffs.

Grains, meal and feeding stuffs and all agricultural produce should be sampled in the same manner as prescribed for fertilisers.

When the feeding stuff is in the state of cake, select not less than three cakes where the quantity does not exceed one ton, not less than five cakes when the quantity does not exceed five tons, and not less than ten cakes when the quantity exceeds five tons.

Break the selected cakes into small pieces, mix them together, and take the sample—not less than one pound—from the mixture.

Directions for Taking Samples of Fertilisers.

If delivered in bags, select not less than two bags when the quantity does not exceed one ton, and one additional bag for every additional ton.

In no case need more than ten bags be selected.

Empty the selected bags separately on to a clean wooden or stone floor. Thoroughly mix the contents, and set aside one spadeful from each bag, mix together the separate spadefuls, and from the mixture take about one pound as a sample.

If the fertiliser is in bulk, mix together portions taken from the different parts, and draw the sample from the mixture.

Directions for Taking Samples of Water.

All samples should be sent in glass bottles. Stoneware jars are to be avoided. The bottles should preferably be provided with glass stoppers; if corks are used, they must be new and well washed previously in pure water.

In sampling a stream or tank, before taking the samples rinse out the bottle several times with water, taking care to avoid the introduction of mud or sediment.

Before taking a sample of water from a pipe, allow the water to run through it for a few minutes at full pressure.

In all cases, before the sample is taken, always rinse out the bottle several times with the water to be sampled.

Quantity to be taken: 1 gallon.

Directions for Taking Samples of Milk and Cream for Butter-Fat Determinations.

The bulk from which the sample is to be drawn should be first poured two or three times from one vessel to another, and about half-a-pint forwarded for examination.

If it is impossible to deliver the sample in a fresh condition, introduce into each sample bottle about as much of the following preservatives as can be held upon a threepenny piece:—Borax, boric acid or salicylic acid; stating which preservative has been used.

All bottles used must have been previously cleansed with boiling water.

Charges for Dipping Cattle at Government Dipping Tanks.

A charge of 1d. per head is made in respect of all cattle dipped at Government dipping tanks.

Unweaned calves will be dipped free of charge.

Payment may be made in cash or by means of books of coupons at £1, 10/- and 2/6, which can be obtained from Civil Commissioners, Native Commissioners, or through all Veterinary Surgeons and Cattle Inspectors.

The tanks to which these provisions at present apply are the following :—

Salisbury (3), Bulawayo (3), Inyati, Umtali, Penhalonga, Melsetter, Marandellas, Macheke, Mazoe, Lomagundi, Hartley, Gwelo, Selukwe, Enkeldoorn, Victoria, Gwanda, Gatooma, Que Que, Umvuma, Kimberley Reefs.

Lectures for Farmers

The services of certain of the officers of the Department of Agriculture and the Veterinary Department are available for purposes of delivering lectures on subjects upon which they have special knowledge. As far as practicable, lectures will be accompanied by demonstrations at the time or subsequently in the field. Owing to the many calls on the time of the staff and the exigencies of their duties, alternative dates are desirable in order to avoid disappointment. The following topics are offered as examples of subjects that may be dealt with in this manner, but the suggestion of other themes is invited.

Agriculture.—Maize growing; Maize selection and maintenance of the breeding plot; Points of maize and maize judging, with demonstrations; Utilisation of granite vlei soils; Ground nut culture; Rotation crops for home use and for sale; Veld improvement by winter grasses; Production of foodstuffs for the mines; Ensilage; Fungoid diseases of maize and wheat; Wheat, oats and lucerne under irrigation; The prospects of cotton culture in Southern Rhodesia.

Veterinary Hygiene.—Detection and prevention of disease; The care of live stock.

Live Stock.—Judging of cattle according to breeds, and for beef, milk and draught; feeding and kraaling of live stock; general principles of cattle breeding; management of imported stock; grading up of native or local stock with pure bred bulls.

Dairying.—Home butter-making; building and equipment of a farm dairy; handling and marketing of milk; packing and marketing of butter; construction of cow houses.

Swine Husbandry.—Breeding and feeding of swine; some

suggestions for the production of first-class bacon pigs; construction of piggeries at moderate cost.

Chemistry.—The principles of soil fertility; the principles of manuring; the value of lime in agriculture; chemistry of milk and its products (accompanied by demonstrations in milk-testing).

Entomology.—Economic entomology on the farm; the role of insects and their allies in the transmission of disease; scale insects and fruit trees and methods for their control; insect pests and maize; enemies of the potato, insect and fungus; the value and objects of plant import and nursery regulations.

Irrigation.—Methods of applying water to land for irrigation; the measurement of water in connection with irrigation; canal irrigation; storage reservoirs; hints on the selection of sites and on the design of earthen and other dams; irrigation by pumping, with notes on the selection of plants.

Enquiries and invitations should in the first instance be addressed to the Director of Agriculture, Salisbury.

Departmental Bulletins.

The following Bulletins, consisting of reprints of articles which have appeared in this Journal, are available for distribution free of charge to applicants in Southern Rhodesia only:—

AGRICULTURE.

No. 61. Requirements in sending Botanical Specimens to the Department for Identification.
No. 62. Services of Agricultural Engineer.
No. 64. Hints on Irrigation—Small Gravitation Schemes, by W. M. Watt.
No. 81. Possibilities of Export Trade in Oil Seeds, by H. Godfrey Mundy, F.L.S.
No. 90. Reports on Experiments—Experimental Station, Salisbury, 1910-1911, by J. H. Hampton.
No. 94. Second Report on Experiments, by J. H. Hampton.
No. 155. The Manuring of Maize on the Government Experimental Farm, Gwebi, 1912-13.
No. 160. Hints on Irrigation—Pumping Plants, by W. M. Watt, Agricultural Engineer.
No. 177. Notes on the Raising of Seedling Trees, by F. B. Willoughby.
No. 189. The Manuring of Maize on the Government Experiment Farm, Gwebi, by G. N. Blackshaw, B.Sc., F.C.S.
No. 192. A Calendar of Crop Sowings, by H. Godfrey Mundy, F.L.S.
No. 203. Ensilage, by J. A. T. Walters, B.A., and The Feeding of Ensilage to Dairy Cattle in Winter, by R. C. Simmons.
No. 206. Hints on Irrigation: Small Earthen Storage Reservoirs, by W. M. Watt.
No. 212. Citrus Fruits in Rhodesia, by A. G. Turner.
No. 216. Manuring of Maize on Government Experiment Farm, Gwebi, by A. G. Holborow, F.I.C.
No. 218. Useful Measurements of Maize, by J. A. T. Walters, B.A.
No. 220. Reports on Crop Expefiments, Gwebi, 1914-15, by E. A. Nobbs, Ph.D., B.Sc.
No. 221. Results of Experiments, Longila, 1914-15, by J. Muirhead.
No. 222. Costs of Farm Operations, Gwebi.
No. 239. Reports on Crop Experiments, Gwebi, 1915-16, by E. A. Nobbs, Ph.D., B.Sc.
No. 240. Manuring of Maize and Fertiliser Experiments at Gwebi, by A. G. Holborow, F.I.C.
No. 246. Reports on Crop Experiments, Gwebi, 1915-16, Part II., by E. A. Nobbs, Ph.D., B.Sc.
No. 300. The Dangers and Prevention of Soil Erosion, by W. M. Watt.
Tree Culture in Southern Rhodesia, by P. B. S. Wrey, A.M.I.C.E.

CROPS.

No. 88. Chicory Growing, by H. Godfrey Mundy, F.L.S.
No. 106. Cultivation and Preparation of Ginger.

No. 126. Turkish Tobacco.
No. 132. Sumatra Tobacco, Hints to Rhodesian Growers, by C. J. Sketchley.
No. 138. Tobacco Culture (Virginia)—Harvesting and Curing.
No. 170. Production of Pedigree Seed—Maize, by H. Godfrey Mundy, F.L.S.
No. 174. Notes on Hop Growing, by H. Godfrey Mundy, F.L.S.
No. 175. Notes on Lucerne, by H. Godfrey Mundy, F.L.S.
No. 176. The Cultivation of Castor Oil Beans, by H. Godfrey Mundy, F.L.S.
No. 179. Buckwheat, by H. G. Mundy, F.L.S.
No. 181. Sunflower Cultivation, by H. G. Mundy, F.L.S.
No. 188. The Ground-Nut or Monkey Nut, by H. Godfrey Mundy, F.L.S.
No. 193. Oats in Southern Rhodesia, by H. Godfrey Mundy, F.L.S.
No. 194. Rye, by J. A. T. Walters, B.A.
No. 201. Dhal or Pigeon-Pea, by J. A. T. Walters, B.A.
No. 207. Crop Rotation in Southern Rhodesia, by J. A. T. Walters, B.A.
No. 225. Napier Fodder or Elephant Grass, by J. A. T. Walters, B.A.
No. 232. Witch-Weed or Rooi-Bloem, by J. A. T. Walters, B.A.
No. 235. Crops Unsuitable to Southern Rhodesian Conditions, by J. A. T. Walters, B.A.
No. 244. New Crops for Rhodesia, by J. A. T. Walters, B.A.

ENTOMOLOGY AND VEGETABLE PATHOLOGY.

No. 43. Citrus Psylla.
No. 75. Fumigation of Fruit Trees with Hydrocyanic Acid Gas, by R. W. Jack, F.E.S.
No. 139. Termites, or "White Ants," by Rupert W. Jack, F.E.S.
No. 140. Insect Pests of Tobacco in Southern Rhodesia, by R. W. Jack, F.E.S.
No. 142. The Bean Stem Maggot, by R. W. Jack, F.E.S.
No. 147. Root Gallworn, by R. W. Jack, F.E.S.
No. 148. Darkling Beetle Grubs Injurious to Tobacco, by R. W. Jack, F.E.S.
No. 151. Potato Spraying Experiments for the Control of Early Blight, by Rupert W. Jack, F.E.S.
No. 154. Borers in Native Timber—Results of Experiments with Preservatives, by Rupert W. Jack, F.E.S.
No. 158. Two Ladybirds Injurious to Potato Plants, by R. W. Jack, F.E.S.
No. 171. The Cabbage Web-Worm—A Pest of Cabbage and Allied Plants, by R. W. Jack, F.E.S.
No. 172. Diseases of the Potato Tuber and the Selection of Sound Seed, by R. W. Jack, F.E.S.
No. 178. Illustrations of Natural Forest in relation to Tsetse Fly, by R. W. Jack, F.E.S.
No. 187. The Dusty Surface Beetle, by Rupert W. Jack, F.E.S.
No. 197. Chafer Beetles, by R. W. Jack, F.E.S.
No. 204. Some Injurious Caterpillars, by R. W. Jack, F.E.S.
No. 214. Some Household Insects, by R. Lowe Thompson, B.A.
No. 219. More Household Insects, by R. Lowe Thompson, B.A.
No. 228. Rhodesian Citrus Pests, by R. W. Jack, F.E.S.
No. 233. Does it Pay to Spray Potatoes in Southern Rhodesia? by Rupert W. Jack, F.E.S.

VETERINARY.

No. 50. Epizootic Abortion in Cattle, by Ll. E. W. Bevan, M.R.C.V.S.

No. 51. Strangles, by F. D. Ferguson, M.R.C.V.S.

No. 53. Animals Diseases Consolidation Ordinance, 1904.

No. 65. Common Ailments of the Horse, by D. R. Chatterley, M.R.C.V.S.

No. 84. African Coast Fever—Diagnosis of Gland Puncture, by Ll. E. W. Bevan, M.R.C.V.S.

No. 95. Oestrus-ovis in Sheep, by Alec King.

No. 103. Dipping and Tick-Destroying Agents, by Lt.-Col. H. Watkins-Pitchford.

No. 121. Rabies, by Ll. E. W. Bevan, M.R.C.V.S., and T. G. Millington, M.R.C.V.S., D.V.H.

No. 165. Report of Veterinary Conference, Bulawayo, April, 1913.

No. 180. Note on the Treatment of Biliary Fever of the Horse with Trypan Blue, by Ll. E. W. Bevan, M.R.C.V.S.

No. 191. Scab or Scabies in Sheep and Goats, by Rowland Williams, M.R.C.V.S.

No. 195. Some Notes on the Systematic Dipping of Stock, by C. R. Edmonds, Assistant Chief Veterinary Surgeon, and Ll. E. W. Bevan, Government Veterinary Bacteriologist, Southern Rhodesia.

No. 202. Distomatosis or Liver Fluke in Cattle and Sheep, by Rowland Williams, M.R.C.V.S.

No. 215. African Coast Fever, by Ll. E. W. Bevan, M.R.C.V.S.

No. 223. A Note on Contagious Abortion, by Ll. E. W. Bevan, Government Veterinary Bacteriologist.

LIVE STOCK.

No. 96. Swine Breeds and Breeding of, by Loudon M. Douglas, F.R.S.E.

No. 101. Hints to Dairy Farmers, by J. C. Jesser Coope, F.C.S., N.D.D.

No. 145. Prospects for Importation of Cattle from Australia, by Eric A. Nobbs, Ph.D., B.Sc.

No. 161. Notes on Cattle Breeding, Part III., by R. C. Simmons.

No. 190. The Principle of the Winter Feeding of Dairy Cattle, by R. C. Simmons.

No. 208. Water in the Diet of Live Stock, by Ll. E. W. Bevan, M.R.C.V.S.

No. 210. The Care and Feeding of Calves in Dairy and Stud Herds, by R. C. Simmons.

No. 211. The Fattening of Pigs on Granite Farms in Mashonaland, by R. C. Simmons.

No. 227. An Experiment in Beef Production, by R. C. Simmons.

No. 229. Breeding and Feeding of Pigs for Bacon Factory Purposes, by R. C. Simmons.

No. 238. Compulsory Dipping, by E. A. Nobbs, Ph.D., B.Sc., and J. M. Sinclair, M.R.C.V.S.

No. 242. Construction of Dipping Tanks (Revised).

No. 243. Shedding for Milch Cows, by R. C. Simmons.

No. 245. Beef Feeding Experiment No. 2, by R. C. Simmons.

MISCELLANEOUS.

No. 93. Formation of Agricultural Credit Associations in Rhodesia, by Loudon M. Douglas, F.R.S.E.

No. 129. How to Make Use of the "Fencing Ordinance, 1904," by N. H. Chataway.

No. 134. Plans and Specifications for Flue Curing Tobacco Barns.

No. 144. Rhodesian Tobacco—Prospects of an Australian Market, by Eric A. Nobbs, Ph.D., B.Sc.

No. 152. A School of Agriculture for Southern Rhodesia, by Eric A. Nobbs, Ph.D., B.Sc., Director of Agriculture.

No. 157. Hints on Brickmaking, by G. T. Dyke.

No. 163. Report on the Methods of Growing, Curing and Selling Bright Tobacco in Virginia, U.S.A., by H. Kay Scorror.

No. 183. The Rainy Season in Southern Rhodesia, by the Rev. E. Goetz, S.J.

No. 184 Cream—Its Separation, Handling and Sale to Butter Factories, by R. C. Simmons.

No. 186. Concrete and Reinforced Concrete, by E. Hardcastle, M.I.E.E.

No. 196. Collection of Agricultural Statistics in Southern Rhodesia, by Eric A. Nobbs, Ph.D., B.Sc.

No. 198. Poultry Keeping for the Rhodesian Farmer, by Frank Sheppard.

No. 199. Eucalypts for the Farm, by J. J. Boocock.

No. 205. Home Butter Making, by R. C. Simmons.

No. 209. The Agricultural Returns for 1914, by B. Haslewood, F.S.S.

No. 213. Hydraulic Rams, by W. Martin Watt.

No. 217. Windbreaks and Hedges, by F. B. Willoughby.

No. 224. Statistical Returns of Crops, 1914-15, by E. A. Nobbs, Ph.D., B.Sc., and B. Haslewood, F.S.S.

No. 226. Classification of Clouds.

No. 230. Farm and Live Stock Statistics, 1915, by Eric A. Nobbs, Ph.D., B.Sc., and B. Haslewood, F.S.S.

No. 231. Estimates of Maize and Tobacco Crops, 1915-16, by Eric A. Nobbs, Ph.D., B.Sc., and B. Haslewood, F.S.S.

No. 234. Eucalypts suitable to Southern Rhodesia, and how to Grow them, by F. B. Willoughby.

No. 236. Notes on Propagation by Means of Cuttings in Rhodesia, by F. B. Willoughby.

No. 237. The Analysis of Agricultural Products, Soils, Water, etc.

No. 241. Hints on Cement Concrete, by W. M. Watt.

Malarial Fever : How it is caused and how it may be prevented, by Sir Ronald Ross, F.R.C.S., D.Sc., LL.D., F.R.S., K.C.B., etc.

Malaria : its History, Prevention and Cure, by A. M. Fleming, C.M.G., M.B., F.R.C.S. (Ed.), D.P.H. (Camb.), Medical Director.

Game Law : Summary of.

Terms for Analysis by the Department of Agriculture, of Produce, Soils, Water, etc

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HANDBOOK OF TOBACCO CULTURE for Planters in Southern Rhodesia. Sold by the Department of Agriculture. 2/6.

Employment on Farms.

The Department of Agriculture receives numerous enquiries from persons of varied attainments, age and financial position for openings on farms, as managers, assistants and learners, requiring remuneration on corresponding scales, or willing to give services in return for keep.

In order that work may be found for the above and needs of farmers met, applications are invited from both employers and persons seeking employment. Applications are also invited from artisans, such as masons, bricklayers, carpenters, fencers, well sinkers, concrete workers, and the like who may desire work on farms. In cases where employers have obtained the labour they require, or applicants for employment have found work, it is requested that notification be at once sent to the Department of Agriculture, in order that unnecessary correspondence be avoided.

Replies to the following applications should be addressed to the initials of the advertisers, c/o Director of Agriculture, who will forward the letter to the party referred to.

Note.—The following advertisements will not be repeated unless the advertisers inform us they wish them to be continued:—

SITUATIONS VACANT.

L. R.—For steady, reliable man with good credentials, must understand oxen and general farming; knowledge of irrigation an advantage. Free keep and percentage crops. Large acreage. Victoria district.

A. F.—For a learner, poultry and general farming, Gwelo district.

SITUATIONS WANTED.

A. B. B.—As manager on general farm; experienced in stock, agriculture and dairying; excellent references.

Government Notices.

No. 50 of 1912.] [8th February, 1912.

(As amended by Nos. 329 and 383 of 1914.)

AFRICAN COAST FEVER.

Regulations regarding the movement of cattle and the prevention and suppression of disease.

1. UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw Government Notices Nos. 329 of 1910 and 308 of 1911 and make the following provisions in lieu thereof :—

2. The various districts of Southern Rhodesia are hereby declared an area infected with African Coast Fever for the purposes of section 5 (2) of the aforesaid Ordinance, and, save as hereinafter set out, all movement of cattle within the said districts is prohibited until further notice.

General Movement.

3. For the purpose of section 22 (1) of the said Ordinance, the following shall be regarded as places within the boundaries of which the movement of cattle may be allowed without special permission :—

(a) Single farm.

(b) An area occupied by an owner or lessee, under one management, comprising contiguous farms and situated within one cattle transport area. The mere possession by an owner or lessee of grazing rights over a contiguous farm or farms shall not constitute occupation of such farm or farms.

(c) An area the property of one owner.

(d) For grazing purposes, an area within a radius of four miles of native kraals situated on unalienated land or in reserves, save and in so far as such area includes any private land.

The sites of such kraals shall be deemed to be the places where they are situated at the date of promulgation of these regulations.

(e) An area under the management or control of any Municipality, Sanitary Board or Village Management Board.

4. Notwithstanding the provisions of the last preceding section, or of section 9 hereof, the Chief Inspector may, on the outbreak of disease, or for such other cause as may be deemed expedient, direct the isolation or quarantine of cattle on a limited area of the aforesaid places.

5. The movement of cattle from place to place may be permitted under the special permission, in writing, of an Inspector, Sub-Inspector, or other officer or person duly authorised by the Administrator to grant such permission.

6. No permission as aforesaid shall permit the movement of cattle—

(a) Without the written consent of the owners, occupiers or managers of occupied land, and in the case of native reserves, of the Native Commissioner of the district over which land or reserve such

cattle will pass, whether along roads or otherwise; provided, however, that refusal to grant such consent shall be in writing, and provided further that if the Controller of Stock or the Chief Inspector shall consider that such consent is withheld without good and sufficient cause he may permit of movement without such consent.

If any such person mentioned above refuse to give consent or to state a reason for refusing to do so in writing, no valid objection shall be deemed to exist and movement may be permitted without such written consent.

(b) Within a veterinary district as defined in the Schedule annexed hereto from one transport area to or through another without the consent of the Cattle Inspector in charge of such area.

(c) From any veterinary district to or through another without the consent of the District Veterinary Surgeon of such district.

Slaughter Cattle.

7. Cattle moved to any centre for slaughter under the provisions of these or any other regulations shall, on arrival, be immediately taken to such quarantine area (if any) as is provided for the purpose and immediately branded with the letters "V.D." on the near hip.

8. Cattle admitted to a quarantine area in terms of the last preceding section shall be slaughtered within twenty-one days of the date of admission, and shall not be permitted to leave the same except for the purpose of being slaughtered at the appointed abattoir, and if found outside such area, except for the said purpose, may be destroyed on the order of the Chief Inspector or Controller of Stock; provided, however, that the Chief Inspector may allow the removal of cattle from such an area under such conditions as he may prescribe.

Transport Cattle.

9. The use of cattle for draught purposes is prohibited except :—

(1) Within the boundaries of the places defined in section 3 (a), (b) and (c) hereof.

(2) Within the boundaries of areas already fixed for the use of cattle for draught purposes in terms of regulations published under Government Notice No. 329 of 1910, or such other areas as may be fixed by the Administrator.

10. Notwithstanding the provisions of section 9, no permit shall authorise the working of cattle

(a) which are not clearly and distinctly branded with the registered brand of the owner;

(b) in any wagon or vehicle which shall not have the owner's name and address legibly and permanently inscribed on the right side thereof.

11. No wagon or other vehicle drawn by oxen shall be moved from one cattle transport area into another without the permission of the Cattle Inspectors concerned, and under such conditions as they may impose.

General Provisions.

12. On the outbreak or suspected outbreak of disease, the Administrator may declare an area of infection around and embracing the place of outbreak or suspected outbreak, and a further area or areas around such area of infection as a guard area, whereupon all movement of cattle into and from place to place within such area or areas shall be immediately suspended, except as hereinafter provided.

A.—*In areas of infection and guard areas:—*

(1) Cattle in transit by rail may be moved through such area.

(2) Cattle from beyond the borders of Southern Rhodesia may be detrained within such area or areas *en route* to destination.

(3) Cattle for *bona fide* farming, dairy and slaughter purposes may be moved into such area or areas by permission of the Chief Inspector and under such conditions as he may impose.

B.—*In guard areas only:—*

Cattle may be moved into and from place to place within such area under the conditions of section 6 hereof.

13. The removal of green forage, hay, fodder, bedding reeds, manure or of such other articles as may be reasonably supposed capable of conveying infection, shall be prohibited from areas of infection, save and except with the special permission of the Administrator.

14. Whenever an area shall have been declared under section 12 hereof, every person within such area, or within such further area as may be specified by Government Notice, owning or in charge of cattle shall, upon the death or slaughter because of disease, suspected disease, or accident, of any such cattle, immediately report such occurrence through the nearest Cattle Inspector, Native Commissioner or Police Officer to the District Veterinary Surgeon.

15. Notwithstanding the provisions of these regulations, it shall be competent for the Chief Inspector of Cattle to authorise and direct the movement of cattle for the purposes of isolating, dipping, quarantine, or any other such objects as may be deemed necessary to prevent or suppress an outbreak of disease.

16. Whenever an area shall have been declared an area of infection or guard area in terms of section 12 hereof, any person who shall allow any cattle to stray or be otherwise removed, except as provided for in these regulations, from any one place within such area to another place, or from a place outside of to a place within such area, shall be guilty of an offence against these regulations.

17. All cattle within the limits of the various commonages and townlands, areas of infection and guard areas as declared under section 12 hereof, or depastured on common grazing ground, shall be dipped or sprayed at least once in every three days, unless the Chief Inspector shall authorise the extension of the time between such dipping or spraying, or the entire suspension of the same.

18. In all areas of infection and guard areas sheep and goats shall be dipped at such periods as may be directed by the Chief Inspector.

19. Whenever the owner, occupier, or manager of a farm shall adopt means of cleansing cattle running thereon, either by spraying, dipping, or by any other method, the Chief Inspector may order any natives or other persons having cattle on the same farm to cleanse such cattle, and the Native Commissioner of the district within which the farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed upon between the said owner, occupier or manager and the said native owners.

20. All permits for the removal of cattle issued under the provisions of the said Ordinance or of any regulations framed thereunder shall specify legibly and clearly on the face thereof the place from and to which such cattle may be removed, the route by which they shall travel, the number and brands of such cattle, the time allowed for the journey, and such other particulars and conditions as it may be deemed expedient to provide.

21. No permit issued for the movement of cattle shall be taken to authorise any trespass in connection with such movement.

22. Notwithstanding the provisions of these regulations, it shall not be lawful for any owner of cattle to allow any such cattle to be on any road, public outspan, commonage, or any property other than that of the owner,

unless they are free from ticks or unless they have been effectively cleansed by dipping, spraying or other process, within fourteen days of being allowed on such road or other place. Any beast having ten or more ticks on it shall not be considered free from ticks.

23. Any person contravening the provisions of these regulations or the conditions set out in permits issued thereunder, shall, where no higher penalty has been by the said Ordinance or any other law provided, be liable in respect of each offence to a fine not exceeding £20, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months.

SCHEDULE "A."

Veterinary Districts of Southern Rhodesia.

(1) *Salisbury.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

32. Battlefields; 33. Hartley and Gatooma; 34. Gadzema Station; 35. Makwiro Station; 36. Norton Siding; 37. Hunyani Tank; 38. 1645½ Peg B. & M. & R. Railways; 39. Salisbury A.; 40. Salisbury B.; 41. Salisbury C.; 42. Salisbury D.; 43. Arcturus; 44. Bromley; 45. Marandellas North; 46. Marandellas South; 48. Headlands Station; 49. Junction Mazoe and Lomagundi Railways; 50. 23-Mile Peg, Lomagundi Railway; 51. Passaford Station; 52. 35-Mile Peg, Lomagundi Railway; 53. Gwibi Tank Halt; 54. Banket, Lomagundi; 55. Eldorado, Lomagundi; 56. Selby Siding; 57. Mazoe; and 58. Kimberley Reefs.

(2) *Bulawayo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

1. Plumtree; 2. Marula Siding; 3. Figtree; 4. Westacre Junction; 5. Bulawayo Area; 6. Heaney Junction; 7. Bembesi Station; 8. Insiza North; 9. Insiza South; 10. Shangani North; 11. Shangani South; 14. Redbank; 15. Nyamandhlovu Station; 16. Malindi Station; 17. Wankies Area; 18. Matetsi Siding; 19. Matopo Terminus; 20. Sabiwa Siding; 21. Gwanda Station; 22. West Nicholson; 23. Belingwe; 59. Essexvale and Balla Balla Areas; 60. Stanmore Siding Area; 61. Filabusi Area.

(3) *Gwelo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

12. Somabula Siding; 13. Gwelo Station; 24. Selukwe Area; 25. Surprise Area; 26. Indiva Siding; 27. Lalapanzi; 28. Iron Mine Hill Siding; 29. Umvuma Siding; 31. Que Que Station.

(4) *Umtali.*

An area comprising the native districts of Umtali, Melsetter, Makoni and Inyanga.

No. 320 of 1916.] [1st September, 1916.

HIS Honour the Administrator in Council has been pleased, under the powers conferred upon him by the "Animals Diseases Consolidation Ordinance, 1904," to cancel sub section (2), section 12 A of Government Notice No. 50 of 1912, and to substitute the following in lieu thereof :—

"Cattle from beyond the borders of Southern Rhodesia may be detained within such area or areas for purposes of inoculation or other veterinary treatment, and upon completion of such treatment may be removed therefrom to their destination."

AFRICAN COAST FEVER.

Areas of infection and guard areas declared in terms of Government Notice No. 50 of 1912.

Melsetter Native District.

(a) *Areas of Infection.*

The farms Highlands, Rockwood, Joppa, Clearwater, Nooitgedacht, Randfontein, Avontuur, Enhoek, Ravenswood, Roslyn, Woodstock, Landsdown, Heilrand, Kenilworth, Wolvedraai, Houtberg, Springfield, Quagga's Hoek, Rumble Hills, Groenvlei, Cecilton, Grass Flats, Moosgwe, Lombard's Rust, Diepfontein, Wolverhampton, Johannes' Rust, Helvetia, Ostend, Geluk, Morgensen, Jameson and Rocklands.

(b) *Guard Areas.*

That portion of the native district of Melsetter south of the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri and the Nyanyadzi River.

That portion of the native district of Melsetter north of and including the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri and the Nyanyadzi River.

Umtali Native District.

(a) *Areas of Infection.*

The farms Penkridge and Thabanchu.

(b) *Guard Area.*

That portion of the native district of Umtali lying south of the Impodsi River from its junction with the Odzi River to its junction with the Shetora River, thence up the Shetora River to the farm Butler North and including that farm and Banti North.

Gwelo Native District.

(a) *Areas of Infection.*

The farms Riverbend, Sunbury, Cross Roads, Wegdraai and Reserve.

(b) *Guard Area.*

Bounded by a line drawn from the Gwelo River along the northern boundary of the Main Belt Block to the farm Argyle; thence along the western boundaries of Argyle and Roscobie and from the north-west beacon of the latter in a direct line to the south-west beacon of Summerview; thence along the southern boundaries of Summerview, Hopeton, Leith Hill, Kilkenny, Borisvale and Amiens to the Sebakwe River; thence up the Sebakwe River to the farm Avoca; thence along the western boundary of Avoca, the north-western and south-western boundaries of the Central Estates to the farm Irving; thence along the western boundaries of Irving and Mull to the railway line; thence along the latter to the boundary of the Gwelo Commonage; thence along the easterly and northerly boundaries of the latter to the Gwelo River; thence down this river to the point first named.

Salisbury and Mazoe Native Districts.

(a) *Areas of Infection.*

1. Epworth, Adelaida and Glenwood farms.
2. Sternblick farm.
3. Bluff Hill farm.

4. Borrowdale Estate, Helenvale, Glen Lorne, Luna, Carrickcreagh and Greystone farms.

5. An area bounded by and including the following farms: Belford Estate, Belford Estate No. 2, Belford Estate North (excluding that portion lying east of the railway), vacant land on which the Jumbo Mine is situated (excluding that portion lying north-east of the fence erected between the farm Whitfield and the railway line), Foyle, Welbeck, 100-acre lots and vacant land, Tjibakwe and Belford Estate No. 3.

(b) *Guard Areas.*

1. An area bounded by and including the following farms: Stamford, Good Hope, Henricksen, Mabelreign and Tynwald.

2. An area bounded by and including the following farms: Naauwplaats, the southern boundary of Belford Estate, Msasa, Great B, Spelonken, Thetford, Balkiza, Willesden, Welston, Teviotdale, Zizalisari Outspan, Avondale, Salisbury Commonage, Hatfield Estate, the eastern boundaries of Glenwood and Adelaide, Ventersburg, Dispute, Donnybrook, Caledonia, Gardiner, Father Hartmann, Chishawasha, The Crag, The Grove, Halstead, Chindamora Reserve, vacant land west of Poorti River, Glenbervie, Maggiesdale, Brundret, Spitzkop, Summerdale, Rockwood, Somerset, Southmoor, Howick Estate, Leeuw's Rust, Klein Kopjes, Oude Kraal and Mooi Leegte.

MTOKO, MREWA AND MARANDELLAS NATIVE DISTRICTS.

(a) *Area of Infection.*

An area bounded by a line drawn from the north-western beacon of Showers, along the western boundary of Showers, Gongwe, Magar, northern and western boundaries of Highlands, north-western and south-western boundaries of Allen, western boundary of Holton Estate, western and southern boundaries of Belmont Outspan, north-western boundary of White Gombola, western boundaries of Bonn, Calne, Wilton, northern and southern boundaries of Delta, and southern boundaries of The Cave and Mere; thence up the Macheke River to the south-western beacon of Monte Cassino; thence along the southern and eastern boundaries of Monte Cassino to its most northern beacon; thence in a direct line to the south-western beacon of Changwe Ranch No. 1; thence along the northern boundary of Fairfield Estate to the Nyagadzi River; thence down this river and the Ruenya River to the eastern boundary of this territory; thence along this boundary in a northerly direction to the Mazoe River; thence up that river to its junction with the Shambara River; thence up that river to Manyeu Mountain; thence in a straight line to the eastern beacon of the Msana Reserve; thence up the Inyagui River to the easterly beacon of Middlesex; thence along the northern boundaries of Middlesex, Kent, Suffolk, Sussex and Rupture and the eastern boundary of Argosy to the point first named.

Note.—The above areas were declared under the following Government Notices:—Of 1915, Nos. 247, 283, 394 and 438; of 1916, Nos. 66, 128, 155, 177, 213, 243, 253, 275, 396 and 405.

No. 214 of 1916.] [9th June, 1916.

AFRICAN COAST FEVER.

WHEREAS there has been an outbreak of destructive disease—to wit, African Coast Fever—on the farm Riverbend, in the native district of Gwelo, His Honour the Administrator in Council has been pleased, under the powers vested in him by the "Animals Diseases Amending Ordinance, 1911," to declare the following area to be actively infected with African Coast Fever for the purposes of the said Ordinance.

Description of Area.

An area comprising the following farms:—Main Belt Block farms east of the Long Valley Spruit, Erin, Doon, Krom River, Clearwater, Northfield,

Foxton, Harston, Game Park, Riverdale, Long Valley, Bosch Kloof, Barkly, Turffontein, Cross Roads, Wegdraai, Reserve, Shawlands, Roslin, Loads, Riverbend, Sunbury, Garryowen, Ardpatrick, Woodhouse, Adair, Strathfillan, Headwaters, Bendhu, Mnyami, Hillside, Traveller's Rest, Troy, Barton, Ermelo, Lochiel, Umhlali, Mliza, Que Que Reserve and the British South Africa Company's ground between the rivers Que Que and Bembezaan.

No. 225 of 1916.] [23rd June, 1916.

AFRICAN COAST FEVER.

WHEREAS there has been an outbreak of destructive disease—to wit, African Coast Fever—at Mrewa's Kraal, in the native district of Mrewa, His Honour the Administrator in Council has been pleased, under the powers vested in him by the "Animals Diseases Amending Ordinance, 1911," to declare the following area to be actively infected with African Coast Fever for the purposes of the said Ordinance.

Description of Area.

That portion of the native district of Mrewa lying south of the main Salisbury-Mtoko road.

Nos. 381 of 1914 and 200 and 266 of 1916.]

COMPULSORY DIPPING.

UNDER and by virtue of the powers vested in me by section 7 of the "Compulsory Dipping Ordinance, 1914," I hereby declare that the provisions of that Ordinance shall be applied in respect of cattle within the following areas from the date of issue of these Notices, dipping to take place at such intervals as the Chief Veterinary Surgeon shall direct.

The areas under the control of the Municipalities of Salisbury, Bulawayo, Gwelo and Umtali, the Sanitary Boards at Gatooma and Victoria, and the Village Management Boards at Que Que, Melsetter, Penhalonga, Marandellas, Hartley, Enkeldoorn, Avondale, Umvuma, Selukwe, Gwanda, Blinkwater, Plumtree and Rusape.

Further, I do hereby declare that a charge of one penny per head will be made in respect of all cattle dipped at Government dipping tanks, except unweaned calves, for which no charge will be made; and one penny in respect of all horses, mules and donkeys, and ½d. in respect of all sheep.

AFRICAN COAST FEVER: COMPULSORY DIPPING OF CATTLE.

Areas within which dipping of cattle is compulsory under section 7 of the "Animals Diseases Consolidation Ordinance, 1904."

GWELO.

An area comprising the following farms:—Main Belt Block farms east of the Long Valley Spruit, Erin, Doon, Krom River, Clearwater, Northfield, Foxton, Harston, Game Park, Riverdale, Long Valley, Bosch Kloof, Barkly, Turffontein, Cross Roads, Wegdraai, Reserve, Shawlands, Roslin, Loads, Riverbend, Sunbury, Garryowen, Ardpatrick, Woodhouse, Adair, Strathfillan, Headwaters, Bendhu, Mnyami, Hillside, Traveller's Rest, Troy, Barton, Ermelo, Lochiel, Umhlali, Mliza, Que Que Reserve and the British South Africa Company's ground between the rivers Que Que and Bembezaan.

MREWA

That portion of the native district of Mrewa lying south of the main Salisbury Mtoko road.

BULAWAYO, UMZINGWANE, MATOPOS, BUBI AND BULALIMA-MANGWE.

An area including parts of the native districts of Bulawayo, Umzingwane, Matopo, Bubi and Bulalima-Mangwe, bounded by and including the following farms :—

Lochard Block, Greenlands, Wessels, Allendale B, Oscardale, St. Ninian's, Fincham's, Inyati Reserve, Lortondale, Wynslay Estate, Greville, that portion of unalienated land lying south of a line drawn from the most westerly beacon of Dollar Block and the north-eastern beacon of Killegar, Killegar, Braemar Block, Portive, Robert Block, Induna, Waterfall, Dingaan, Rouxdale, Fundisi, Umkein, Seaborough, Devonby, Helenvale, Slight's, Billar's, Craiglee, Bluebonny, Ireland, Welcome, Paul's Rest, McGeer's Luck, Centenary Mission, Maritzburg, Springvale, Outspan No. 3, Tati Road, De Hoop, Anglesea, Mineral King, World's View, Matopo Block, Brethren in Christ Mission Farm, Absent, the unsurveyed land lying north of a line drawn from the south-east beacon of Absent to the south-west beacon of The Range, The Range, Clark's, Swaithe's, Limerick, Pioneer's Rest, Mayhill, Rietfontein, Bradford, Hamilton, Mayfair, York, Indina, Rathline, Westondale, sub-division A of Fochabers, Fochabers, Kodhwayo, Zimbile and Lochard Outspan.

SOUTH MELSETTER.

All surveyed farms in the native district of Melsetter south of the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge and Biriwiri, including the Ingorima Reserves and Mafusi Reserve, and excluding the farms Umzelezwe, Nyagadzi, Mhungura, Pangela, Passage, Mangani, Chengwe, Gumera, Umbugu, Nhori, Elongwe and Mamzwera.

NORTH MELSETTER AND SOUTH UMTALI.

That portion of the native district of Melsetter north of and including the farms Stonehenge, Vooruitzicht, Lindley, Melsetter Commonage, Reserve, Cambridge, Biriwiri, and the Nyanyadzi River; and that portion of the native district of Umtali lying south of the Impodsi River from its junction with the Odzi River to its junction with the Shetora River, thence up the Shetora River to the farm Butler North and including that farm and Banti North.

SALISBURY AND MAZOE.

An area in the Salisbury and Mazoe native districts bounded by and including the following farms :—Lilfordia, Saffron Waldon, Kilworth, Porta, Reserve, Clement's Plot, Warwickshire, Oatlands, Amalinda, The Rest, Langford, Saturday Retreat, Reserve, Odar, Stoneridge, Longlands, Seki Native Reserve, Dunstan Estate, Banana Grove, Mayfair, Galway Estate, Sebastopol, Gardiner, Gilnockie, Cromlet, Learig, Reserve, Meadows, Mount Shannon, Halstead, western portion of Chindamora Reserve, Pote, Valeria, Spelonken, Arnold's, Smithfield, Brundret, Spitzkop, Summerdale, Rockwood, Somerset, Southmoor, Howick Estate, Leeuw's Rust, Klein Kopjes, Oude Kraal, Mooi Leegte, Reserve, Bitton, Syston, The Lily and Killiemore.

Note.—These areas were declared under the following Government Notices :—Of 1915, Nos. 70, 206, 318 and 355; of 1916, Nos. 215 and 226.

COMPULSORY DIPPING OF CATTLE.

Areas within which dipping of cattle is compulsory under section 2 of the "Compulsory Dipping Ordinance, 1914."

ENTERPRISE—SALISBURY.

An area bounded by and including the following farms :—Halstead, Mount Shannon, The Meadows, Ivordale, Ivanhoe, Oribi, Colga, Neptune

Mashona Kop, Mashona Vlei, Vuta, Chinyika, Lonely Park, Grazeley Guernsey, adjoining vacant ground, Cromlet, Father Hartmann, Chisha washa, Stuhm, The Springs, The Grove and Umritsur.

MELSETTER AND UMTALI.

All surveyed farms and the Ingorima and Mafusi reserves, in the native district of Melsetter, excluding Umzelezwe, Nyagadzi, Mhunguru, Paugela, Passage, Mangani, Chengwe, Gumera, Umbugu, Nhori, Elongwe and Mamzwera; and including the following farms in the native district of Umtali: Tom's Hope West, Steynstroom, Thabanchu, Penkridge, Macandrews, Cronley and Lisnacloon.

SALISBURY, MAZOE AND HARTLEY.

An area bounded by and including the following farms:—St. Mary's, Stoneridge, Odar, Reserve, Saturday Retreat, Chizanza, Suum Cuique, Arbroath, Langford, The Rest, Amalinda, Oatlands, Warwickshire, Clement's Plot, Reserve, Porta, Lyndhurst, Riverside, Herren Hausen, Lilfordia, Killiemore, The Lily, Ballineety, Fairview, Spa, Passaford, Springvale, Mbebi, Umsasa, Great B, Christon Bank, St. Gerera, Willesden Farm, Borrowdale Estate, Luna, Glen Lorne, Gletwyn, Sternblick, Manresa, Caledonia, Sebastopol, Galway Estate, Mayfair, Nalire Reserve, Buena Vista and Seki Reserve.

MAKWIRO—HARTLEY.

An area bounded by and including the following farms:—Umfulia, Dorothy Hill, vacant land, Seigneury Reserve, Zimbo Junction, Serui Drift, Strathmore, Scotsdale, Cape Boys' Reserve, Railway Farm No. 22, vacant land between Railway Farm No. 21 and Spencer, Spencer, Railway Farm No. 23, Woodsgift, Railway Farm No. 25, Southwood, Northwood, Niklot, Rothwell Extension, Hunyani Estate, Hunyani Estate No. 2, Stanhope, Cromdale, Garthnor, Serui, Curlewood, Cotswold and vacant land and farms lying within a line from the most easterly beacon of Cotswold to the north-east beacon of Fort Martin, thence to the south-east beacon of Fort Martin and from there due south to the Umfuli River and down that river to the farm Umfulia.

MARANDELLAS AND SALISBURY.

An area bounded by and including the following farms:—Rakodsi, Longlands, Shepparton (portion of Lendy Estate), Progress, Rockery, Shortlands, Rastenburg, Loquat Grove, Cornwall, Norfolk, Middlesex, Kent, Suffolk, Sussex, Rupture, Argosy, Weir, Inandu, Seaton, Rapture, Sunny Fountains, Mangwendi Mission, Retreat and Springvale.

SHAMVA—MAZOE.

An area bounded by and including the following farms:—The Carse, Burnleigh, Woodlands, Ceres, Murgwi, Zombi, Chewarika, Maienzi, Maxton, Lone Star Reserve No. 2, Richlands, M. E. D. Reserve, New Brixton, Dillon, Mullingar, Mumwi, Chipoli, Ellerslie, Wolley, Wapley, Lion's Den, and thence from the south-eastern beacon of Lion's Den up the Poorti River to the north-western beacon of The Carse.

RUSAPE—MAKONI.

An area bounded by and including the following farms:—The Willows, The Springs, Howick, Leeuw Poort, Highfield, Emerald, Kirkly Vale, Lawrencedale Estate, Chimbi, Notgotimyet, Diana, Inyagura, Cheira, Cheira Source, Invercargill, Wick, Makoni Reserve, Mount Zonga, Reserve, Inyamasanga, Windsorton, Manda, Zimati, Mount Tikwiri, Rocking Stone, Lesapi Falls, Recondite, Cheronga and Lesbury.

BINDURA—MAZOE.

An area bounded by and including the following farms:—Wiseacre, Erin, Pimento Park, Duiker Flat, Jesmond Deane, The Ridge, Malvern, Selwood, Marston, Nan Terra, Retreat, Nomansland, Vergenoeg, Caledon,

Chiwaridza Reserve, Dengeni, Vredehoek, Arcadia, Hereford, The Vale, Bonny, Wild Dog Valley, Atherstone, Kingston, Hildadale, Cardiff and Poorti Outspan.

Note.—These areas were declared under the following Government Notices :—Of 1915, Nos. 402 and 423; of 1916, Nos. 21, 22, 98, 126, 159, 208, 370 and 373.

No. 404 of 1916.] [10th November, 1916.

COMPULSORY DIPPING OF CATTLE: MATABELELAND AREA.

IN accordance with the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," notice is hereby given that the owners resident in the area described below have by a majority of votes requested His Honour the Administrator to bring compulsory dipping of cattle into operation in the said area.

Any person desiring to lodge an objection to the bringing into operation of compulsory dipping as aforesaid shall do so on or before the 12th January, 1917.

Description of Area.

That portion of Matabeleland lying west of a line drawn from a point where the Gwaai River enters the Zambesi River; thence up the former and the Shangani River to the northern boundary of the Karna Block; thence following the northern and eastern boundaries of this block to the Karna River; thence up this river and the northern and eastern boundaries of the Shangani Native Reserve to the Shangani River; thence up this river to the northern boundary of Kenilworth Block; thence by and including Kenilworth Block, North Shangani Farm, Baltimore, Lynes Farm, Joseph Block, Bulawayo Syndicate Block, Mbati Tiabetsi Block, Shangani Reserve and Reserve, Battle Farm, Leechdale, Thornville, Dandasi, Ripley, Bon Accord, Liscard, Belmont, Forfar, De Beers Block and Torwood Lee; thence in a northerly direction along the northern boundary of Belingwe Reserve No. 1 to the Lundi River; thence down this river to a point where the old pioneer road crosses it; thence down this road to the Nuanetsi River and down this river to the northern boundary of Wanezi Block; thence along the eastern and southern boundaries of this block and Jopempi Block to a point where it is crossed by the road from Mazunga to Messina; thence along the eastern boundary of this road to the Limpopo River.

No. 406 of 1916.] [10th November, 1916.

COMPULSORY DIPPING OF CATTLE: HARTLEY-GATOOMA-BATTLEFIELDS AREA.

IN accordance with the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," notice is hereby given that the owners resident in the area described below have by a majority of votes requested His Honour the Administrator to bring compulsory dipping of cattle into operation in the said area.

Any person desiring to lodge an objection to the bringing into operation of compulsory dipping as aforesaid shall do so on or before the 12th January, 1917.

Description of Area.

An area bounded on the north by the Umfuli River from its junction with the Ummati River to its junction with the Doronanga River; on the east by and including the Mondoro Native Reserve and the British South Africa Company's Rhodesdale Ranche; on the south by and including the Rhodesdale Ranche; on the west by and including the Rhodesdale Ranche to the Sebakwe River, thence down that river to its junction with the Ummati River, and down that river to its junction with the Umfuli River

No. 410 of 1916.] [17th November, 1916.

COMPULSORY DIPPING OF CATTLE: VICTORIA AREA.

IN accordance with the provisions of section 2 of the "Compulsory Dipping Ordinance, 1914," notice is hereby given that the owners resident in the area described below have, by a majority of votes, requested His Honour the Administrator to bring compulsory dipping of cattle into operation in the said area.

Any person desiring to lodge an objection to the bringing into operation of compulsory dipping as aforesaid shall do so on or before the 19th January, 1917.

Description of Area.

From the junction of the Ngesi and Shasha Rivers up the latter river to the southern boundary of the Gurajena Native Reserve; thence along the southern boundaries of this reserve and the farms Drewton and Climay to the Makoholi River; thence down this river to the south-west corner of the Nyamarundu Native Reserve and along the southern boundaries of this reserve, the Zimutu Reserve and the Chikwanda Reserve "A," and the northern boundaries of the Chikwanda Reserves "B" and "C" to the Chingezana River and down this river till it crosses the northern boundary of the farm Yettom; thence along the northern boundaries of this farm and the farms Mara Ranche and Ashcombe to the Chishire River, and up this river to its headwaters; thence in a straight line to Mt. Bungu; thence along the north-western and western boundaries of the Makouri Native Reserve to the farm Allendale; thence by and including the farms Allendale, Cardigan, Glendhu, Iram, Vlakfontein, Niekerk's Rust, Iwade, Histonhurst, Arawe, Cheveden, Inyoni, Kelvingrove, Erich Sthal, Oatlands, The Retreat, Morgenster, Mzero and Tentergate to the south-western beacon of the latter farm; thence in a north-westerly direction to a point on the Pioneer Column Road and southwards along this road to the Tokwe River; thence up this river and the Shasha River to the starting point.

No. 186 of 1914.] [23rd April, 1914.

IMPORTATION OF CATTLE.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel the regulations published under Government Notice No. 128 of 1914, and make the following provisions in lieu thereof :—

1. The importation of cattle will be permitted from the Cape Province, the Orange Free State and the Transvaal on the following terms and conditions :—

(1) A permit shall be required from the Chief Inspector, which may contain such conditions as shall from time to time appear expedient.

(2) The importation of cattle with more than two permanent central incisor teeth shall not be permitted, except that animals entered in the South African Stud Book or the appendix thereto, with not more than the first and second pairs of permanent incisors, may be imported.

(3) Applications for permission to import shall be in the form "A" attached hereto, and accompanied by a declaration in the annexed form "B."

(4) All importations shall be by rail, and for the purposes of importation, Bulawayo shall be the port of entry.

(5) All cattle imported in terms of these regulations shall, on arrival at Bulawayo, Salisbury or Umtali, be submitted to such examination or tests as the Chief Inspector may direct. If such examina-

tion or tests disclose the existence of any destructive disease, the cattle shall be immediately destroyed and the carcases thereof disposed of in such a manner as a Government Veterinary Surgeon may authorise or require. The Chief Inspector may permit of the age restriction and the tests aforesaid being dispensed with in the case of cattle in transit by rail to any place beyond the borders of Southern Rhodesia.

(6) All expenses or losses incident to quarantine, examination, testing or destruction as aforesaid shall be borne by the owner of the cattle.

2. The importation of cattle from the United Kingdom of Great Britain and Ireland, the United States of America, the Kingdom of the Netherlands and Germany will be permitted under the following terms and conditions :—

(1) Importation shall be through and direct from the ports of Cape Town or Port Elizabeth, and there shall be a consignment note or other satisfactory evidence that cattle so imported have come direct from one of the above-mentioned countries.

(2) The provisions of sub-sections (1), (5) and (6) of section 1 hereof shall apply to importations in terms of this section.

3. Any person introducing cattle in contravention of these Regulations, or failing to comply with any of the conditions attached to permits to import, or furnishing applications, declarations, or other necessary documents known to be false in any material particular, or failing to comply with all lawful directions as to quarantine, examination, testing, destruction or disposal of carcases, shall be liable to a fine not exceeding £20 for each animal in respect of which such offence shall have been committed, and in default of payment to imprisonment with or without hard labour for any period not exceeding six months, unless higher or greater penalties shall have been provided for such offences by the "Animals Diseases Consolidation Ordinance, 1904"; provided, however, that the penalties imposed by these Regulations shall not exempt any cattle from destruction in terms of the aforesaid Ordinance.

ANNEXURE "A."

APPLICATION FOR CATTLE IMPORTATION PERMIT.

1. Applicant's Name and Address.....
2. Number and Class of Cattle to be imported.....
3. Area or Farm and District where Cattle are at present located.....
.....
4. Area or Farm and District to which Cattle are to be moved.....
.....

Applicant's Signature.....

Date.....

Application.....

Permit No.....

ANNEXURE "B."

I, ... residing on the farm ..... in the district of ..... do solemnly and sincerely declare that the ..... (number in writing) animals also enumerated below have been in my possession since birth, and that Lungsickness (Contagious Pleuro-Pneumonia) has not existed amongst any of my cattle, nor on my farm, during the last four years, and that these animals have never been exposed for sale in any public market or stock fair.

Number of Animals ..... Bulls ..... Heifers .....

Breed .....

Seller's Name and Address .....

.....

Purchaser's Name .....

Place in Southern Rhodesia to which animals are being sent

.....

And I make this solemn declaration conscientiously believing the same to be true.

.....

Declared to at ..... on this ..... day of..... before me,

.....

Resident Magistrate for the District of .....

IMPORTATION OF STOCK FROM THE PROVINCE OF THE CAPE OF GOOD HOPE.

WITH reference to Departmental Notice of 28th February, 1912, it is hereby notified that the said Notice is cancelled, and importation of stock will now be permitted, in terms of Government Notice No. 110 of 1908, from the Province of the Cape of Good Hope, with the exception of the following districts :—

Komgha
East London
Peddie
Victoria East
Kingwilliamstown
Stutterheim
Cathcart
Stockenstroom
Queenstown (Gwatyu Ward only)
Glen Grey
Maclear
Elliot Slang River
Wodehouse
Barkly East

No. 169 of 1916.] [5th May, 1916.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Animals Diseases Consolidation Ordinance, 1904," to permit, under the terms and conditions of sub-sections (1), (5) and (6) of section 1 of Government Notice No. 186 of 1914, the importation from the Cape Province, Transvaal, Orange Free State and Natal of pure-bred cattle originally imported from the United Kingdom of Great Britain and Ireland, the United States of America and the Kingdom of the Netherlands. Every application for permission to import shall be accompanied by a certificate in the form of the annexure attached hereto.

Annexure.

I.....residing on the farm.....in the district of.....in the Union of South Africa, do solemnly and sincerely declare that the.....(number in writing) animals enumerated below have been in my possession for.....and that lung-sickness has not existed amongst any of my cattle during that period: and further, that such animals are not prevented by any regulations or agreement in respect of freight from being exported from the Union.

Description of Animals.

Breed.	Stud Book in which entered.	Sex, Name and Number in Stud Book.	Country of Origin.
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....

And I make this solemn declaration conscientiously believing the same to be true.

.....

Declared to at.....on this.....day of..... 19.....before me,

.....

Resident Magistrate for the district of.....

Names of former owners.....

.....

No. 342 of 1916.] [22nd September, 1916.

HIS Honour the Administrator has been pleased, under the provisions of the "Animals Diseases Consolidation Ordinance, 1904," to make the following regulation regarding the importation of animals from stock sales :—

The provisions of the regulations governing the importation of cattle, published under Government Notice No. 186 of 1914, shall *mutatis mutandis*, and as far as applicable, apply to animals entered in a South African Stud Book or appendix thereto, when purchased or procured at sales approved of by the Chief Inspector of Stock; provided, however, that a permit to import the same shall only be issued on the production of a sworn declaration of the subjoined form.

I, ...residing on the farm..... in the district of.....in the Union of South Africa, do solemnly and sincerely declare that the.....(number in writing) animals enumerated below have been in my possession from .....(date) and that lung-sickness has not existed amongst any of my cattle since that date, and that these animals have been duly registered in the South African Stud Book or the appendix thereto.

DESCRIPTION OF ANIMALS.

Breed.	Sex.	Name and Number in Stud Book.
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

And I make this solemn declaration conscientiously believing the same to be true.

.....

Declared to at..... on this..... day of ..... 19... before me.

.....

Resident Magistrate for the District of.....

Names of former owners.....

.....

.....

Purchaser's name.....

Place in Southern Rhodesia to which animals are being sent.....

No. 364 of 1914.] [27th August, 1914.

REGULATIONS GOVERNING IMPORTATION OF LIVE STOCK, Etc.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended from time to time, I do hereby cancel the regulations published under Government Notices Nos. 295 and 394 of 1908; 38, 61 and 263 of 1909; and 60 of 1911 and 188 of 1912, 47 of 1913, and so much of any other regulations as may be repugnant to or inconsistent with the subjoined regulations, which are hereby declared to be of full force and effect.

1. The importation of the following animals from the respective countries or districts enumerated is prohibited, owing to the existence or supposed existence of destructive diseases affecting the said animals in the said countries :—

(1) All animals and dogs as defined by the aforesaid Ordinance from—

India,
Mauritius,
Persia,
British Burmah,
Assam,
China and bordering countries, including Korea,
French Indo-China,
Dutch East Indies,
Hong-Kong,
Federal Malay States,
The Philippines,
Zanzibar,

and all other countries where surra is known or suspected to exist.

(2) Pigs from the Union of South Africa, the Bechuanaland Protectorate, the Tati Concession, and other countries in which swine fever exists or is suspected to exist, subject, however, to the exceptions contained in the proviso to this section.

(3) Dogs from the territories of Northern Rhodesia and Portuguese East Africa, subject, however, to the exceptions in the proviso of this section.

(4) Sheep and goats from the districts of Albany, Alexandria, Bathurst, Bedford, East London, Fort Beaufort, Humansdorp, Jansenville, Kingwilliamstown, Komgha, Peddie, Somerset East, Stockenstroom, Uitenhage and Victoria East, in the Cape Province; the districts of Barberton, Lydenburg, Marico, Pretoria, Rustenburg, Waterberg and Zoutpansberg, in the Transvaal; Swaziland, Portuguese East Africa, Northern Rhodesia.

Provided, however—

(a) that the Chief Inspector may at his discretion permit the importation of pigs, sheep and goats from the above-mentioned places on production of a certificate signed by a duly authorised Government Veterinary Officer in the form of Schedule "A" attached hereto;

(b) that the importation of dogs required for scientific purposes only may be permitted from the places mentioned in sub-section (3) hereof, by the Chief Inspector, in writing, subject to such conditions as may be imposed by him;

(c) that dogs, sheep, goats and pigs from countries from which importation is permitted may be introduced *via* the port of Beira, provided that all such animals shall be transferred directly after disembarkation to the railway trucks at Beira, and conveyed thence to Umtali without leaving the said trucks.

2. The areas set out in Schedule "B" hereto are hereby appointed for the depasturing and quarantining of animals for slaughter in connection with the places therein mentioned.

3. The several districts of Southern Rhodesia are hereby declared to be an area infected with scab amongst sheep and goats, and the movement of all sheep and goats from any farm to beyond the limits thereof, or from their usual grazing ground within the limits of any town lands or native reserves to any other place, is prohibited, except under the written permit of an Inspector or Sub-Inspector. Such permit shall set forth the number and description of animals to be moved, the route they shall travel, and the period for which the permit shall be in force. In cases where it may be necessary or desirable, the person to whom such permit is issued may be required to cause the animals referred to therein to be dipped before being moved.

4. The introduction of sheep and goats is prohibited except—

(a) as specially provided for by section 1 hereof;

(b) from places not mentioned in section 1, if accompanied by a certificate in the form set out in Schedule "C" hereof.

5. The owner or person in charge of any horse, mule or donkey entering Southern Rhodesia by rail shall immediately report such arrival to the Veterinary Office at Salisbury, Bulawayo and Umtali respectively, and no such animal shall be detrained at any intermediate station without the written authority of a Government Veterinary Surgeon.

6. The owner or person in charge of any horse, mule or donkey entering Southern Rhodesia by road shall immediately report such arrival at the Police Camp nearest to the place where such entry is made, and the officer in charge of such Police Camp shall immediately report to the Veterinary Department, which shall direct what steps are to be taken to test such animals with mallein, as in the following clause provided.

7. All horses, mules and donkeys, upon entering Southern Rhodesia, shall be tested with mallein, and the owner or person in charge of such animals shall in all respects carry out the lawful directions of the Inspector while such animals are being tested; provided that this regulation shall not apply to animals in transit through Southern Rhodesia which are not detrained *en route*.

8. Horses, mules and donkeys lawfully in this Territory, and required for purposes necessitating frequent crossing of the border, may be allowed to so cross on such terms as to registration, branding, testing and conditions as the Chief Veterinary Surgeon may from time to time deem expedient to prescribe.

9. An Inspector may direct the thorough cleansing and disinfecting of trucks which may be reasonably suspected of being sources of infection of any destructive disease, and may direct the destruction of truck fittings, fodder, excreta, or other matter or thing which may be reasonably calculated to convey such infection.

10. Any persons contravening the provisions of these regulations, or the instructions or directions given in terms of these regulations, shall be liable in respect of each offence to a penalty not exceeding twenty pounds, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months, unless where more or heavier penalties have by the aforesaid Ordinance, or by other regulations framed thereunder, been expressly provided.

SCHEDULE "A."

Certificate.

Issued under provisions of section 1, Government Notice No. 364 of 1914.

This is to certify that the animals enumerated below are, in my opinion, free from any destructive disease, including heartwater; and, to the best of my knowledge and belief, have not been in contact with any infected animals,

nor come from, or through, a locality where any such disease is known to exist or has existed for twelve months from date hereof.

Date....., 19...

Place .....

.....

Signature of
Government Veterinary Surgeon.

Number and general description of animals :

.....Pigs, ...Sheep, ...Goats.

Place from which animals are to be sent :

.....

Owner's name and address :

.....

.....

Place in Southern Rhodesia to which it is desired to send the animals .....

SCHEDULE "B."

Description of areas set apart for depasturing and quarantining of animals for slaughter.

Salisbury.—A fenced piece of land, 400 acres in extent, situated on the Makabusi River below Maggio's plot, within the Salisbury commonage and towards the southern boundary thereof.

Bulawayo.—That piece of fenced land situated on the Bulawayo commonage between the railway line, to the south, and the Solusi road, adjoining and to the south-west of the Government dipping tank, in extent 1,000 acres more or less.

Gwelo.—Starting from a point where the Ingwania road crosses the railway, along this road past the sanitary stables to a point a quarter of a mile west, thence in a line parallel with the railway to the Gwelo River, thence along the river to the commonage beacon No. 11, thence in a straight line to the Shamrock road where it is intersected by the Scout's Spruit, thence along the Shamrock road to where it joins the Main Street extension, thence along this to the railway line, and down this to the starting point.

Umtali.—A piece of fenced land situated on the old Darlington Farm section of the Umtali commonage.

Penhalonga.—A piece of fenced land situated on plot No. 2, Imbeza plots.

Selukwe.—A piece of fenced land, in extent about 300 acres, situated on the farm Sebanga and adjacent to the township of Selukwe.

SCHEDULE "C."

I, ... residing at ...../.....
in the district of... ..... in the.....
Colony, do solemnly and sincerely declare that the animals enumerated below are free from any contagious disease, including scab, and have not been in contact with any infected animals within six months from date hereof, and that, to the best of my knowledge and belief, such animals, in travelling to.....† station, will not come in contact with any animals amongst which scab or any other contagious disease exists.

And I make this solemn declaration conscientiously believing the same to be true.

.....

Declared to at.....on this.....
day of.....before me.

.....
Magistrate, Government Veterinary Surgeon, Scab Inspector, or Police Officer of district from which animals are being sent.

Number and general description of animals being sent.....
Owner's name and address.....
.....
Place in Southern Rhodesia to which animals are being sent.....

† Station within Colony of origin.

ISSUE OF PERMITS FOR THE REMOVAL OF STOCK.

IT is hereby notified for public information that His Honour the Administrator has approved of members of the British South Africa Police issuing permits for the removal of cattle, sheep and goats at the undermentioned stations when no Inspector or Sub-Inspector of Cattle is available :—

Nyamandhlovu.	Mphoeng's.
Gwanda.	Holi.
Plumtree.	Filabusi.
Fort Rixon.	Gwaai.
Belingwe.	Figtree.
Inyati.	Umvuma.
Fort Usher.	Que Que.
Mazunga.	Tuli.
Makwiro.	Sinoia.
Banket Junction.	Buhera.
Makaha.	Beatrice Mine.
Sipolilo.	Wedza.

No. 305 of 1916.] [25th August, 1916.

(As amended by No. 341 of 22nd September, 1916.)

WHEREAS it is necessary to afford facilities for transport with cattle between the Iron Mine Hill, Chilimanzi, Zimutu, Umvuma and Victoria areas as described in Schedule "A" to Government Notice No. 387 of 1914, His Honour the Administrator in Council has been pleased, notwithstanding any regulations to the contrary, to provide that the Chief Inspector may authorise such movement, in writing, subject to such terms and conditions as he may deem fit to impose.

No. 375 of 1912.] [28th November, 1912

IMPORTATION OF POULTRY.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended by the "Animals Diseases Amendment Ordinance, 1910," I do hereby declare and make known that the following regulations shall be in force and effect from date of publication hereof :—

(1) All poultry imported by rail shall be inspected by an Inspector or Sub-Inspector at Plumtree, Bulawayo or Umtali.

(2) Should any consignment of poultry shew symptoms of disease, or should such Inspector or Sub Inspector have reason to believe that any dis

ease exists in, or that infection is likely to be conveyed by such consignment, he may order the detention and isolation of the whole consignment for such period as he may deem necessary.

(3) The Chief Inspector may order the destruction of all poultry which he has reasonable grounds for believing to be diseased or likely to convey infection.

THE following extract from Live Stock Regulations, printed on page 150 of the South African Railways Official Tariff Book, is published for general guidance :—

Poultry are not accepted by rail unless they are placed in a crate and the following conditions are complied with :—

(1) The size of the crate shall be 3 feet 6 inches by 2 feet 9 inches external floor dimensions; for turkeys and geese the height shall be 30 inches; and for fowls, ducks, and poultry of a like size, the height shall be 20 inches.

(2) Each crate must contain two drinking vessels filled with pure water, such vessels to be not less than five inches in depth, of the unspillable type, one being fixed at opposite corners of the coop.

(3) Each crate shall contain two receptacles for food of a suitable size, filled with suitable food other than whole maize.

(4) The birds must not be over-crowded in the crates, and in no case must there be more than 20 fowls, ducks or other birds of a like size, or ten turkeys or geese

(5) Different species of birds must not be placed in the same coop.

Unless coops, crates, and the like are strong enough to bear ordinary transit handling, the Administration will not accept responsibility for loss.

No. 349 of 1916.] [29th September, 1916.

ESTABLISHMENT OF A POUND AT SHAMVA.

HIS Honour the Administrator has been pleased, under the provisions of section 5 of "The Pounds and Trespasses Ordinance, 1903," at the request of the Civil Commissioner, Salisbury, to declare and make known that a pound has been established at Shamva, in the magisterial district of Salisbury, and that the said pound shall be available for the public from date hereof.

No. 374 of 1916.] [20th October, 1916.

ESTABLISHMENT OF A POUND ON FARM ALPHAETON, UMTALI DISTRICT.

HIS Honour the Administrator has been pleased, under the provisions of section 5 of "The Pounds and Trespasses Ordinance, 1903," at the request of the Civil Commissioner, Umtali, to declare and make known that a pound has been established on Farm Alphaeton, Christmas Pass, in the magisterial district of Umtali, and that the said pound shall be available for the public from date hereof.

SUMMARY OF THE GAME LAWS.

Game is divided into three distinct classes, described as follows :—

(a) Birds and Small Buck.

(b) Bushbuck, Hartebeest, Impala, Lechwe, Pookoo, Roan and Sable Antelope, Sitatunga, Tsessebe, Waterbuck, and Wildebeest.

(c) Royal Game, which includes Eland, Elephant, Giraffe, Gemsbok, Hippopotamus, Inyala, Koodoo, Ostrich, Rhinoceros, Springbuck and Zebra.

The shooting season for Class "A" is as follows :—

In Mashonaland :

Birds from 1st May to 30th September.
Small Buck from 1st May to 31st October.

In Matabeleland :

Birds and Small Buck from 1st May to 31st October.

To shoot in Class "A" a licence costing £1 per annum is required. This entitles holders to hunt in both Provinces during the open season.

Class "B."—The season opens on 1st July and closes on 30th November in both Provinces. The licence fee is £25 for non-residents and £5 for persons having their domicile in Southern Rhodesia. This licence entitles the holder to shoot up to 15 head, which number may be increased to a total of 25 upon payment of a further sum of £15 in the one case and £5 in the other.

Class "C."—The Administrator may, if he is satisfied that the animals are actually required for scientific purposes, grant to the holder of a game licence permission to shoot or capture any of the species included in this Class. Such permit requires a £5 stamp. Applications in writing, together with proof of *bona-fides*, should be addressed to the Director of Agriculture.

Game for Farming Purposes.—Permits may be granted for the capture of Eland, Ostrich, Zebra or other animals for the purposes of breeding or farming. Such permits require a stamp of the value of £1 and remain in force for six months. Application, accompanied by a sworn declaration, should be made through the Director of Agriculture or the Civil Commissioner of the district.

Game Injuring Crops.—The occupier of any cultivated land or any person acting under the authority of such occupier, may at any time destroy game actually doing damage on such land.

Export of Game.—No living Game or the Eggs of any Game Birds may be exported beyond the limits of Southern Rhodesia without a written permit.

Shooting on Private Land.—A licence does not entitle the holder thereof to shoot on private land without the permission of the land-owner.

Farmers Shooting Game on their Farms.—By taking out a special £1 licence, farmers may at any time shoot any game on their land. "Game" does not include any birds, except ostriches.

Open Area.—The shooting or capturing of all classes of game with the exception of ostriches and other birds classified as game is permitted within the following area in the Hartley district until further notice :—

Hartley District.—From the railway bridge on the Umfuli River, thence north-westwards along the Umfuli River to where it joins the Umniati River, thence southwards along the Umniati River to where it joins the Umsweswe River, thence eastwards along the Umsweswe River up to the drift at the Lydia Mine, thence along the old road from Lydia Mine to Etna Mine and to Inez Mine, thence northwards along the road from Inez Mine to Hartley, thence in the direction of the railway bridge to the starting point on the Umfuli River.

The game specified may be shot in this area without a licence.

Protected Area.—All game is strictly preserved in the Urungwe Game Sanctuary as defined below :—

An area in the Lomagundi district, bounded as follows : On the north and west by the River Zambesi, starting at the point where the Lozenzi River joins the Zambesi, and following the course of the latter river to its junction with the Sanvati River ; on the east by an imaginary line drawn from the junction

of the Indurune and the Nyaodsa Rivers to the head-waters of the Lozenzi River, and thence along the course of the Lozenzi River to its junction with the Zambesi River; on the south by an imaginary line drawn due west from the point of junction of the Indurune and Nyaodsa to the Sanyati River, thence along the course of this river to where it enters the Zambesi.

Game in Class "A" may be hunted in the close season until further notice on private land in the Melsetter district by holders of a licence.

"Locust Birds" are strictly protected, *vide* Government Notice No. 390 of 1912.

Elephants on Occupied Farms, Melsetter.—The destruction of Elephants when found on occupied farms on the High Veld in Melsetter District is authorised (*vide* Government Notice No. 284 of 1908).

Trespassing on native reserves, in pursuit of game or otherwise, is prohibited, except with the written permission of the Chief Native Commissioner.

Trypanosomiasis.—Persons in search of game in the southern part of the Sebungwe district are warned of the danger of hunting anywhere west of the Sengwe and Lutope Rivers within the fly area, and especially of proceeding anywhere within the valley of the Busi River.

No. 202 of 1916.] [2nd June, 1916.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 4 (2) of the "Game Law Consolidation Ordinance, 1906," to suspend the operations of sections 9 and 12 of the said Ordinance, in so far as they relate to the killing, hunting or capture of game in Classes "A" and "B" in the native district of Sebungwe, for a period of eight months from date hereof.

No. 326 of 1916.] [15th September, 1916.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 4 (2) of the "Game Law Consolidation Ordinance, 1906," to suspend the operations of sections 9 and 12 of the said Ordinance, in so far as they relate to the killing, hunting or capture of game in class "A" in the native district of Wankie, for a period of six months from date hereof.

No. 346 of 1916.] [29th September, 1916.

HIS Honour the Administrator in Council has been pleased, under the provisions of section 4 (2) of the "Game Law Consolidation Ordinance, 1906," to suspend the operations of sections 9 and 12 of the said Ordinance, in so far as they relate to the killing, hunting or capture of game in Class "A," in the native district of Darwin for a period of six months from date hereof.

No. 358 of 1916.] [13th October, 1916.

PROTECTION OF GAME ON VICTORIA COMMONAGE.

HIS Honour the Administrator in Council has been pleased, under the provisions of the "Game Law Consolidation Ordinance, 1906," to declare that all game within the limits of the commonage or town lands of Victoria shall be strictly protected, and shall not be hunted or destroyed for a period of three years from the date of this notice.

No. 201 of 1916.] [26th May, 1916.

REWARD FOR THE DESTRUCTION OF WILD DOGS.

HIS Honour the Administrator in Council has been pleased to approve payment of a reward of five shillings for each wild dog destroyed whose destruction is reported and the reward claimed in the manner hereunder set forth.

Rewards will be paid to Europeans by any Magistrate or Native Commissioner and to natives by any Native Commissioner within three months of the date upon which the animal is killed, on a solemn declaration in the form hereinunder prescribed.

In proof of destruction, applicants for the reward will be required to produce and surrender the skin of the animal with the tail not severed.

Form of Declaration.

I,....., do solemnly and sincerely declare that I did, on the.....day of....., and not before, destroy.....wild dog(s) in the district of....., within the boundaries of Southern Rhodesia, and that I am entitled to the reward offered by the Government, and I make this solemn declaration conscientiously believing the same to be true.

.....
Signature.

Signed and declared at .....this.....day of .....

Before me,

.....
Magistrate or Justice of the Peace.

No. 249 of 1908.] [27th August, 1908.

PROTECTION OF TREES.

IT is hereby notified for public information that any person who shall cut down for use as fuel, or for any other purposes than *bona-fide* farming, mining or manufacturing purposes, or cause to be so cut down the "Wild Westeria" (native name M'Pakwa or M'poea) tree, will be liable to prosecution for contravention of the provisions of the Forest and Herbage Preservation Act, 1859, and upon conviction to a fine not exceeding £100, or to imprisonment with or without hard labour for a term not exceeding six months, or to such fine and imprisonment, or to such imprisonment without a fine.

No. 163 of 1909.] [29th July, 1909.

ANY person who shall cut down or destroy, or cause to be cut down or destroyed, the "Shuma" or "Mashuma" tree, except under written authority from the Estates Office of the British South Africa Company, and subject to such conditions as may be imposed therein, will be liable to prosecution for contravention of the "Forest and Herbage Act, 1859," and, upon conviction, to a fine not exceeding £100, or to imprisonment, with or without hard labour, for a term not exceeding six months, or to such fine or imprisonment, or to such imprisonment without fine.

No. 386 of 1916.] [27th October, 1916.

WATER ORDINANCE.

IT is hereby notified that, under and by virtue of the powers conferred by subsection (1) of section 7 of the "Water Ordinance, 1913," His Honour

the Administrator has been pleased to authorise Percy Peech, Esquire, to divert, impound, take and use public water to the amount of the full normal flow of the stream flowing through his property for two days of twenty-four hours each once in every fourteen days, for the irrigation by him of his riparian land on Rumbavu Park, in the district of Salisbury.

This grant is issued subject to the right of all other riparian owners on the said stream to obtain the right to and thereafter to use a reasonable share of the water in the said stream for irrigation purposes.

No. 387 of 1916.] [27th October, 1916.

WATER ORDINANCE.

IT is hereby notified that, under and by virtue of the powers conferred by sub-section (1) of section 7 of the "Water Ordinance, 1913," His Honour the Administrator has been pleased to authorise Robert Harvey, Esquire, to divert, impound, take and use public water to the amount of that required for the reasonable irrigation of twenty-five acres of land from the Umtali River, for the irrigation by him of his riparian land on the farm Argyll, in the district of Umtali.

This grant is issued subject to the right of all other riparian owners on the said river to obtain the right to and thereafter to use a reasonable share of the water in the said river for irrigation purposes.

No. 409 of 1916.] [17th November, 1916.

APPLICATIONS FOR USE OF WATER

in terms of Chapter I. of the "Water Ordinance, 1913."

IT is hereby notified that the following applications have been made, in terms of the "Water Ordinance, 1913," for authority to use water :—

Name of applicant.	From what river.	Native district of	For the purpose of irrigating a certain portion or portions of the
Knight & Folkestad -	Umfuli	Hartley	Farm Umvovo
B. G. Derry - -	Mazoe	Mazoe	,, No. 4, Glendale—Umzi
British South Africa Company	Tatagura	Mazoe	Farms Smithfield & Brundret and unalienated land
A. Blumenthal - -	Lumane	Matobo	Farm The Grange
F. E. Appleyard -	Mwengi	Mazoe	,, Villa Franca
C. S. Marks - -	Umfuli	Hartley	,, Bedford S.
F. Head - - -	Umguza	Bulawayo	,, Imperial
F. E. Appleyard -	Sowe	Mazoe	,, Villa Franca
Sophia A. Zaffere -	Mazoe	Mazoe	,, St. Gerera, Christon Bank & Spelonken

Any person or persons whose rights may be affected thereby are hereby called upon, in terms of the regulations published under Government Notice No. 439 of 1915, to lodge, within three months from the date hereof, at the office of the Water Registrar, Salisbury, from whom further particulars are obtainable, their objections (if any) to the granting of these applications, together with a full statement of the grounds for such objections.

Department of Posts and Telegraphs,

Southern Rhodesia.

Postal Notice No. 12 of 1913.

AGRICULTURAL PARCELS POST.

IT is hereby notified for public information that, on and after the 1st August, 1909, any article produced, and, if manufactured, produced and manufactured within Southern Rhodesia may be transmitted by Agricultural Parcels Post at the reduced rate of threepence per lb. or fraction thereof, up to a limit of eleven lbs. in weight.

The Agricultural Parcels Post is designed to bring the producer into direct communication with the consumer, and is available for the transmission of :—

Biscuits	Dried Meats	Plants
Bread	Eggs	Poultry
Butter	Flour	Seeds
Confectionery	Flowers	Sugar
Cigarettes	Honey	Tobacco
Dried & Bottled Fruits	Jam	Wool Samples

and other articles produced within Southern Rhodesia. It does not extend beyond the borders of Southern Rhodesia.

The senders of articles at the reduced tariff applicable to the Agricultural Parcels Post will be required to sign a declaration that the contents are the *bona fide* produce of Southern Rhodesia.

The limits of size and weight, and the general regulations, are those applicable to the Inland Parcels Post.

G. H. Eyre,
Postmaster General.

General Post Office, Salisbury,
31st March, 1913.

Postal Notice No. 56 of 1916.

TRANSMISSION OF PLANTS TO THE UNION OF SOUTH AFRICA.

IT is hereby notified for public information that arrangements have been made under which plants from Rhodesia are allowed to enter the Union of South Africa by post, provided each consignment is accompanied by a certificate of cleanliness signed in the case of casual packets by one of the Plant Inspectors at the various ports of entry, or in the case of nursery stock by a registered nurseryman holding an annual permit to introduce his produce into the Union.

Parcels tendered for transmission through the post at places away from a port of entry will be sent to the nearest Plant Inspector, who will furnish the necessary certificate or will deal otherwise with the parcel.

Fruit trees or cuttings thereof must be fumigated before despatch, and a charge of 5s. will be made for each use of the fumigating chamber.

The Customs Officers at Salisbury, Bulawayo, Umtali and Gwelo are Plant Inspectors.

G. H. Eyre,
Postmaster General.

General Post Office, Salisbury,
23rd November, 1916.

RHODESIA

Agricultural Journal.

ISSUED BY

The Department of Agriculture,

SALISBURY, RHODESIA.

ADVERTISEMENTS.

The Journal is issued every alternate month.

Application for advertising space should be addressed to the Editor. The rates are as follows, *per issue*:—

Position.	Whole page. £ s. d.	Half page. £ s. d.	Quarter page. £ s. d.
Inner pages - -	2 0 0	1 5 0	0 15 0
Outer cover (back) -	4 0 0	—	—
Inner covers (back and front) and page facing Contents	3 0 0	1 15 0	1 0 0

A discount of 10 per cent. will be allowed for standing or consecutive advertisements running through six issues. Remittances, and electros where desired, should accompany orders. The right is reserved to discontinue the insertion of standing or consecutive advertisements should payment beyond the second issue be delayed.

The right of approval of all advertisements by the Director of Agriculture is reserved, and his decision as to the acceptance or rejection is final.

An additional charge may be made for advertisements printed in special type, equal to any additional charges made by the printers for setting up same.

Advertisements will be accepted from *bona fide* farmers wishing to effect sale, purchase or exchange of produce, live stock or farm implements, at a minimum charge of 2 6 per insertion of 20 words. Extra words will be charged for at the rate of 1/- for every 10 words.